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THE FLIGHT FROM REASON

By the same Author

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THE HARROVIANS

LOOSE ENDS

THINGS THAT HAVE PUZZLED ME

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AND LITERARY LANDMARKS

A HISTORY OF SKI-ING

THE COMPLETE SKI-RUNNER

THE FLIGHT
FROM REASON
A STUDY OF THE VICTORIAN HERESY

BY
ARNOLD LUNN

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TO
DOUGLAS JERROLD

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PREFACE

THE doctrine that reality is describable in terms of matter and motion, that quality is capable of being expressed in terms of quantity, though an ancient error, deserves to be described as the Victorian heresy; for it was during the Victorian period that materialism ceased to be the fad of the few, and was accepted as the working hypothesis of orthodox science. Darwinism, which has been described as the interpretation of evolution in terms of materialism, appeared to provide the Victorian heresy with a scientific foundation.

Nineteenth-century materialism was as simple and as unsophisticated as nineteenth-century fundamentalism. The orthodox scientist went his untroubled way unsailed by those disquieting doubts which have unsettled the philosophic outlook of modern science and have transformed many a promising physicist into an uneasy mystic. It is improbable that we shall ever recover the confident "gnosis" of the Victorian rationalist.

No modern agnostic would write the following passage which I take from a book which appeared at the very beginning of this century: "Just as the same particles of matter may at one time form parts of a rose, and at another time parts of a mushroom, so the same force may at one time strike a church as lightning, and at another time may be the mother-love that rocks the cradle."¹

The mental outlook which finds expression in this passage belongs to a period when it was considered, as Sir Arthur Eddington remarks, "that the way to understand or explain a scientific phenomenon was to make a correct

¹ *An Easy Outline of Evolution*, by Dennis Hird.

mechanical model of it." We no longer feel confident that reality is capable of so simple an explanation.

But though materialism in the strict sense of the term is dead or dying, that habit of mind which made materialism possible is still alive to-day. If we can diagnose correctly the mental malady which was responsible for the Victorian heresy, we shall be in a better position to understand modern sources of infection.

Throughout this book I have used the term "Victorian scientist" to describe those who assented to the creed which dominated the outlook of Victorian science, and I have used the word "scientist" in a general sense to include philosophers, such as Herbert Spencer, whose views on evolution and other scientific subjects were received with respect.

I do not, however, wish to imply that all Victorian scientists surrendered to the fashion of the moment. There were many who retained the integrity of their judgment even when the flight from reason was most pronounced, and who continued to maintain, as Lord Kelvin maintained, that science so far from lending support to materialism "positively affirms creative and directive power which she compels us to accept as an article of belief."

In conclusion, I should like to express my most sincere thanks to that great institution, the London Library, and to its singularly competent and courteous staff. I spend the greater portion of the year abroad, and my opportunities for working at the British Museum are therefore severely restricted. My debt to the London Library is therefore great, and I acknowledge it partly in the hope of adding to the number of those who enjoy its amenities.

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Ratio autem in homine habet locum dominantis.

ST. THOMAS AQUINAS.

But then with me the horrid doubt always arises whether the convictions of a man's mind, which have been developed from the mind of the lower animals, are of any value or at all trustworthy. Would anyone trust the convictions of a monkey's mind?

CHARLES DARWIN.

CHAPTER I

THE AGE OF REASON

I

THE popular view of the relations between religion and science might be summed up as follows:

"Roman Catholicism is a religion of authority. The Catholic has to believe what his Church tells him to believe; Catholicism is, therefore, based, not on reason, but on blind faith. The ages of faith were uncritical, credulous and superstitious.

"The Reformation, a step in the right direction, was the first serious attempt to free reason from the shackles of faith, and to base religion, not on blind faith, but on reason. The attempt, of course, failed, and science, which alone is based on reason, has smashed the half-hearted compromise of Protestantism, just as Protestantism smashed Catholicism."

The popular view is wrong on all points. The reasonableness of Catholicism is, of course, a question of opinion. That the Roman Catholic Church appeals to reason in support of its claims, and does not ask the convert to accept its authority on trust until its authority has been proved by reason, is a question of fact which can be settled by referring to the *Penny Catechism*.

The medieval theologians, so far from belittling reason, were always in danger of believing that unaided reason could solve all problems.

The Reformation and the scientific movements of the sixteenth century did not appeal from authority to reason, but from reason to experiment. The Protestant appeal to experience and the scientific appeal to experiment are indeed two sides of the same movement.

To this day science, as Professor Whitehead, F.R.S., has remarked, has "remained an anti-intellectualist movement based on a naïve faith."

"Science an anti-intellectualist movement"! One can imagine the effect of such a statement on a scientist born and bred in the atmosphere of Victorian orthodoxy. Professor Whitehead is himself a scientist and speaks with an authority that no modern scientist will dispute. We cannot, therefore, dismiss his stimulating diagnosis of the scientific attitude as a mere paradox.

In the course of this book I hope to produce evidence in support of Professor Whitehead's view, and to show that the contrast between Thomas Aquinas and Thomas Huxley is the contrast between a man who has thought out a consistent philosophy in which creed and code are related, and a man whose life is sustained by "a naïve faith" wholly inconsistent with the philosophic creed which he professes.

Aquinas had unlimited confidence in the power of reason to throw light on ultimate problems. Huxley had no such confidence. He invented the word "agnostic" as the label for those who are convinced that the great riddle is insoluble.

Now the theme of this book is that flight from reason which was precipitated by the irrational philosophy prevalent in Victorian scientific circles. And that flight can best be studied against the background of an age which believed in reason as the ultimate criterion of all human knowledge.

And not only of human knowledge, for the medieval Catholic claimed, just as the modern Roman Catholic claims, that the credentials of the Roman Catholic Church can be proved by pure reason and by pure reason alone.

The argument may be summarised as follows:

Pure reason suffices to prove the existence of God, many of whose attributes can be discovered by philosophers without recourse to revelation; other facts about God,

such as the nature of the Trinity, are not deducible by pure reason, but depend on Revelation. Our next task, therefore, must be to discover whether God has revealed Himself to man and to test by pure reason the credentials of any alleged revelation. We cannot, for instance, appeal to the authority of the Bible unless we have proved by reason that the Bible contains the Revelation of God to man. And to do this, we must apply to the Bible the same critical test which we should apply to any other book purporting to be historical.

The Catholic claims that no unbiased reader can study the Bible without being impressed by the nobility of the view of God proclaimed in its pages, and by the contrast between, say, the gods of Greece and the God of the Psalmist or Isaiah.

The Old Testament, again, is the story of God's dealing with a particular and favoured nation. We are impressed by the sublimity of its teaching, by the miracles recorded in its pages and by the reiterated message of God's wish to save the world from the consequences of sin. We find scattered throughout its pages recurring hints and prophecies of a coming Messiah, the Saviour of the world. When we turn to the New Testament we find these prophecies miraculously fulfilled. The portrait of Our Lord carries conviction. The evidence of the miracles which He performed is very strong. It is impossible to explain the transformation of the Apostles from a broken, dispirited company of disillusioned men into the triumphant evangelists of a gospel which conquered the world, if we deny the Resurrection. No other hypothesis fits the facts. We find, moreover, that Christ declared His intention to found a Church which should endure till the end of time and which should guard His teaching from corruption. The subsequent history of the Church may fairly be described as miraculous, for in spite of its despised origin in a despised race, in spite of the most bitter persecution, it has gradually extended its sway throughout all the Western world. The Church again fulfils the rôle which Christ prophesied

that the Church would fulfil. It has guarded His revelation, it has guarded His teaching from corruption. Heresy after heresy has raised its head in vain against the rock of Peter.

The Church in its nineteenth century of existence has fulfilled the promises of the New Testament just as the New Testament fulfils the Old Testament.

The true Church again will be distinguished from its rivals by the possession of certain "notes." She will be universal, and will claim to teach all nations; she will be one, that is, her members will agree in one Faith and will be united under one Head. No Church but the Roman Catholic Church possesses all these "notes" nor fulfils all these qualifications.

The Roman Catholic Church is, therefore, the Church which Christ founded. Her most important mission is to preserve from corruption the message which Christ came down among men to deliver.

The Catholic claims that he has proved her credentials without appealing to Faith or to authority. "The approach to the Church is," as Father Hugh Pope remarks, "through faith in the Bible regarded as a purely human narrative." But once the authority of the Church is established by reason, it is, of course, rational to submit to that authority and to accept the interpretation of the Church on disputed points of the Bible record.

II

The reader, who is familiar with the Roman Catholic case will, I hope, forgive me for inflicting on him this brief outline of Catholic apologetics, an outline which is rendered necessary by the very general misunderstanding as to the Catholic teaching on the relations between faith, reason and authority, a misunderstanding to be deplored because it is impossible to understand the mental outlook of the Middle Ages without reference to the Catholic philosophy which for fifteen centuries moulded European culture and

European thought. Even the scientist will miss an important clue to the development of the scientific movement if all that he knows of the scholastics is the fact that some of them disputed as to how many angels could dance on the point of a needle.

Again, those who accept with uncritical satisfaction the popular and flattering contrast between the credulous medieval and the hard-headed and rational Victorian fail to realise that Victorian rationalism was a product of the flight from Reason, whereas the thirteenth century deserves the description of a great French scholar, as "the most rationalistic of all centuries." To appreciate the justice of this view it is necessary to distinguish between what is rational and what is right. A rationalist is not a man who disbelieves in the supernatural. A rationalist is a thinker who draws logical and rational conclusions from a given premise, and who is guided by reason rather than by emotion in his search for truth.

The Catholic moral code is, for instance, a rational deduction from Catholic premises; for if our eternal happiness is at stake we should indeed be irrational if we refused to be guided, both in faith and in morals, by that Church which, if its claims are true, alone has authority to interpret the mind of God to men.

The code of the high-minded materialist, on the other hand, is an irrational deduction from materialistic premises, for if thought is a by-product of matter and if free-will is an illusion, morality, in the proper sense of the term, ceases to have any meaning. We do not describe machines as moral or immoral, and on the materialistic hypothesis we differ from machines, only in the fact that we are conscious.

The rationality of any particular conclusion is, of course, unaffected by the truth of the premise from which the conclusion has been deduced. If the Catholic premises could be proved to be false and the materialistic premises could be proved to be true, the medieval theologian whose conclusions logically followed from his premises, would still

rank as a more rational philosopher than the Victorian rationalist, whose conclusions were inconsistent with his premises. The Victorian rationalist, as I hope to prove in a later chapter, might more properly have been described as a muddle-headed mystic.

Again, the familiar contrast between the medieval theologian who appealed to Scripture texts in support of his views, and the rationalist who appeals to reason, ceases to be impressive when we realise that the scholastic did not appeal to Scripture until he had satisfied himself that the credentials of Scripture had been proved by reason.

You will not, of course, find in the *Summa Theologica* of St. Thomas Aquinas, greatest of all the scholastics, a reasoned defence of the authority of the Bible any more than you will find in a treatise on the differential calculus a reasoned defence of the Binomial Theorem. The *Summa Theologica* is not intended as an apologetic for the Catholic faith, but as a treatise on sacred science on the basis of an accepted Bible, addressed to readers familiar with the arguments for accepting the Bible as the Word of God. St. Augustine, who was the first of the Fathers fully to realise the necessity for a rational foundation for the faith, devoted much thought to proving the authority of the Bible on lines very similar to those which have already been summarised in this chapter. Aquinas took all this for granted. He was writing for people who were familiar with Augustine's arguments and consequently he felt justified in beginning where Augustine left off. He appealed to Scripture in much the same spirit that a mathematician would appeal to Euclid. Augustine had done for the authority of Scripture what Euclid had done for geometry.

Those who reject the authority of the Bible are, of course, logical in rejecting the conclusions which the medieval scholastics deduced from Scripture texts, but it is only the loose thinker who will deny theologians like Aquinas a place among the rationalists simply because he rejects the first principles of medieval theology. Relativity is a challenge to the validity of Newton's laws, yet we do not con-

damn the Victorian physicists as irrational because they accepted those laws.

"*Ratio autem in homine habet locum dominantis.*" In these words Aquinas has expressed the guiding principle of his philosophy. Aquinas would probably find more readers today than he does had he rated reason a little less highly than he did. Members of his own Order, the Dominicans, still devote seven years to his philosophy before they can take their D.D. But though I know many Catholics, I have yet to meet a Catholic layman who has devoted, not seven years, but seven hours to the *Summa*.

I do not, of course, dispute the verdicts of those medieval scholars, Professor Tout and Professor A. E. Taylor, who rank Aquinas among the master intellects of all time. Aquinas's range of knowledge was undoubtedly immense. He was the first to attempt a comprehensive survey of philosophy in its entirety, and nobody before or since has made such a determined effort to embrace in one synthesis a comprehensive metaphysical system, and a complete compendium of the religious and civil obligations of man, and of his destiny in the world to come.

Why, then, does this great synthesis possess so narrow and so eclectic an appeal?

I can only hazard a guess, but I am inclined to believe that the explanation must be sought in the complete change of mental climate since the age of Aquinas, a change from a priori reasoning to empiricism.

Every man tends to be either an apriorist or an empiricist; tends, that is, either to argue deductively from first principles or inductively from facts and experience.

The case for Christianity is based, partly on a priori reasoning from first principles and partly on the appeal to experience.

The existence of God may, for instance, either be

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demonstrated by a priori reasoning from first principles, that is by deduction, or by induction from the evidence of design in Nature, or again by the empirical appeal to religious experience.

The following argument, which is one of many advanced by Aquinas for the existence of God, is an excellent example of sound a priori reasoning.

"It is certain and obvious to our senses that some things are in motion. Now whatever is in motion is set in motion by another. . . . If that which sets it in motion is itself in motion, then this again must owe its motion to another, and that again to another. But this cannot go on to Infinity, for in that case there would be no first Mover, and in consequence no other Movers; since subsequent Movers move only because they are set in motion by the first Mover; as the staff moves only because it is set in motion by the hand. It is therefore necessary to arrive at a first Mover set in motion by no other; and this first Mover is understood by all to be God."

This argument, though undoubtedly valid, is a curiously ineffective weapon for the conversion of a modern agnostic. He is uninfluenced by the type of argument which appealed so strongly to the medieval mind. Why? Because we have lost our faith in reason. The Englishman, perhaps, more than other people is by nature an empiricist, and by temperament suspicious of pure logic. He has no use for the God who lies at the end of a chain of syllogisms.

"St. Anselm," writes Tyrrell, "constructs God as inevitably as he constructs his equilateral triangle, but the constructions are equally bloodless. Who cares about his three-cornered equilateral God?" There speaks the modern world. Apologetics, of course, change from generation to generation, and in our age the appeal to intuition and personal experience seems to carry more conviction than the appeal to reason. It is Newman, rather than Aquinas, who brings converts to the modern Church, but I think St. Thomas would have made short work of Newman's conviction of "two and only two luminously self-evident

Beings, myself and my Creator," and would have been equally unimpressed by Newman's appeal to the illative sense, a sense transcending reason, as the surest evidence for the supernatural.

The modern believer has exchanged the austere mental climate of the thirteenth century, a climate warmed only by the cold light of reason, for the more temperate zone of intuition and personal experience.

Aquinas, as Father D'Arcy, S.J., remarks in his admirable study,¹ "takes sides in the age-long quarrel between those who cherish experienced mysticism, love or life as in some way superior to reason, and those who trust only the lamp of the latter in a night where all else may prove to be illusion. We shall see later that St. Thomas is not so inhuman as to exclude the factor of love in his philosophy of life; his dislike is reserved only for those who put 'the reason of the heart before those of the head"'; Father D'Arcy might have quoted in support of this last statement Aquinas's careful and reasoned proof, a proof which finds no place for "the reasons of the heart" that the Blessed in Heaven rejoice in the sufferings of the damned.

The following is a quotation from the Third Part Supplement, Quaestio XCIV, Articles 1, 2 and 3.

"We proceed to the First Article:

Objection 1. It would seem that the blessed in heaven will not see the sufferings of the damned. . . .

I answer that: Nothing should be denied to the blessed which belongs to the perfection of their beatitude. Now all things are the better known for being compared with their contrary. Consequently, in order that the happiness of the saints may be more delightful and that they may give to God more copious thanks for it, they are permitted perfectly to behold the sufferings of the damned. . . .

We proceed thus to the Second Article:

Objection 1. It would seem that the blessed must pity

¹ Thomas Aquinas. (Ernest Benn, Ltd.)

the sufferings of the damned. For pity proceeds from charity, and the most perfect charity will be in the blessed. . . .

Reply to Objection 1. Charity is the principle of pity when it is possible for us, inspired by charity, to desire the termination of a person's unhappiness. But the saints cannot wish this for the damned, since this would be contrary to Divine justice. Consequently the argument does not prove.

We proceed thus to the Third Article:

Objection 1. It would seem that the blessed do not rejoice in the punishment of the damned. For to rejoice in another's misfortune pertains to hatred. But there will be no hatred among the blessed. Therefore they will not rejoice in the unhappiness of the damned. . . .

I answer that: A thing may give cause for rejoicing in two ways. First directly, when one rejoices in a thing for itself. Second indirectly, on account of something annexed to it: and in this way the saints will rejoice in the punishment of the damned, for they will see in this the order of Divine justice and their own escape which will fill them with joy. And thus the direct cause of the joy of the blessed will be the Divine justice and their own deliverance; whereas the punishment of the damned will cause it indirectly."

It is difficult to find any flaw in the logic of this careful argument. One cannot but admire the intellectual honesty which refuses to soften the austerity of this particular thesis. A man who is less half-hearted in his devotion to pure reason would have shrunk from pushing his syllogisms to so grim a conclusion. He might even have been tempted to question premises in which such conclusions are implicit.

Aquinas, as Father D'Arcy remarks, was "coldly indifferent to the world of emotions and imagination except in so far as they subserve his purpose, a metaphysical account of the contents of reality."

He was indeed. When he is discussing that most human of all problems, the problem of matrimony, his mind makes no contact with the human plane.

He quotes 1 Corinthians vii. 4: "The wife hath not power over her own body, but the husband." And his deductions from that text do more credit to his head than to his heart.

I am sure that the most devout of Catholic brides would not turn to Aquinas for guidance in her married life.

Finally, Aquinas would have more influence to-day if the modern attitude towards religion were not permeated, or infected, if you prefer the term, with pragmatism.

The Catholic of to-day is less interested than his thirteenth-century ancestor in many questions which exercised the mind of Aquinas. He is indifferent whether the bodies of the blessed are or are not possessed of subtlety, clarity, etc. "What difference would this make, even if it were proved to be true, to the practical issues of everyday life and to the life of devotion?" Had Aquinas ever asked himself this question many volumes of the *Summa* would have remained unwritten. Aquinas, of course, would have rejected with scorn the pragmatist's test. He had much in common with the true mathematician. A true mathematician always considers applied mathematics rather vulgar, and keenly resents any suggestion that the value of mathematical research is to be measured by the results in, say, engineering. Aquinas, like the mathematician, is concerned with truth for the sake of truth. He moved in a world as remote as the world of mathematical symbols, and such is the power of logical reasoning that he half-persuades us to believe in the importance of those researches which prove so convincingly that the hair and nails rise again at the Last Day, and that the entrails of the body will be filled "no longer with vile superfluities, but with goodly humours."

No modern Catholic, I imagine, either knows or would care to know the interesting distinction between an aureole and an aurea, which is very carefully set forth by Aquinas.

Virgins and martyrs are entitled to an aureole. Angels are not entitled to an aureole, "for it is not owing to virtue that the angels abstain altogether from the pleasures of the flesh, since they are incapable of such pleasures," and therefore, unlike the total abstainer, deserve no aureole for their abstinence.

The pragmatists, of course, dismiss all this eschatological research as irrelevant even if the results could be proved to be true, but Aquinas, as Father D'Arcy observes, "begins where the pragmatist ceases."

In justice to Aquinas it must also be remembered that the thirteenth century was not unique in its taste for fanciful speculations. The modern world is as uninterested in the aureoles of the saints as in Pythagoras's disquisitions on the mystical qualities of numbers. But we too enjoy exercising our minds with problems of no real relevance for practical life. Relativity has taken the place of eschatology. Would a man who travelled with the speed of light to Sirius and back be older than his father when he returned to this planet? How large is the Universe? Is it finite or infinite? Are there several kinds of "time"? Perhaps seven hundred years hence these speculations will appear as fanciful as the reflections of Aquinas on the "goodly humours" that fill the entrails of the Blessed after the Resurrection.

It is also important to remember that though Aquinas devotes a great amount of space to these fanciful speculations, he was far more concerned with the great issues of the religious life, the Church in its various aspects and with the practical problems which confront the faithful Catholic in his journey through the world.

IV

"Never before," writes Henry Adams of the thirteenth century, "have men shown equal energy in such varied directions or such intelligence in the direction of their energy."

This is very true. The energy was the energy of a healthy

child, and the intelligence was the genius of a brilliant child.

"To them," writes the same Henry Adams, "words had fixed values like numbers, and syllogisms were hewn stones that needed only to be set in place in order to reach any height or support any weight."¹ This is, of course, the way a child argues, for a child is often more logical than its elders. It is the adult, not the child, who suspects the power of pure reason to arrive unchecked by experience, at the highest truths.

The thoughtless cruelty of the Middle Ages again, was the cruelty of a child which pulls the wings of insects from idle, unimaginative curiosity.

Once you admit that the difference between the thirteenth and the twentieth centuries is the difference between an immature and a mature civilisation, you will perhaps find the clue to many puzzling contrasts in medievalism.

The twelfth and thirteenth centuries gave us the poetry of Dante, the glory of the great Gothic cathedrals, *The Imitation of Christ*, and the *Summa Theologica*. In 1266 a pig was solemnly put on trial for its life and burnt alive for the crime of eating a child. The highest expression of human genius in philosophy, poetry and art was contemporary with the infinite childishness of the legal trial of animals. Those who exalt the Middle Ages never allude to these puerilities which are, none the less, as symptomatic of the Middle Ages from one point of view as Dante, Aquinas, St. Thomas à Kempis from another point of view.

At the very end of the fifteenth century a distinguished French jurist, Bartholomew Chassenée, made his reputation at the Bar as counsel for some rats, which had been put on trial on the charge of having feloniously eaten up the barley-crop of Autun.²

¹ *Mont St. Michel and Chartres*. (Riverside Press.)

² *The Criminal Prosecution and Capital Punishment of Animals*, by E. P. Evans. (Heinemann.)

Among the many weighty points which were discussed before the trial could proceed was the question as to whether the non-appearance of his clients, the rats, could be condoned owing to the fact that they had not dared make the journey owing to the "the unwearied vigilance of their mortal enemies, the cats." Another point was whether the accused, the rats, were entitled to benefit of clergy. Such burlesques of legal forms were common right through the Middle Ages and covered a wide field. A cock, for instance, was condemned in 1474 to be burnt at the stake "for the heinous and unnatural crime of laying an egg."

As late as 1519 the commune of Stelvio, in Western Tyrol, instituted criminal proceedings against field-mice.¹ The able Counsel for the mice was unable to revoke the edict of banishment, but he demanded safe-conducts to secure his clients "against harm or annoyance from dog, cat or other foe." The judge granted his request and provided the field-mice with "a free safe-conduct and an additional respite of fourteen days to all those which are with young."

A lunatic will often reason logically and if you accept his premises you may find it difficult to reject his conclusions.

There was nothing wrong with the logic of the arguments advanced by learned Counsel for the prosecution and for the defence of the pigs, rats, cocks and other animals brought before the medieval courts, but it was a logic which governs the games of childhood and not a logic which should guide the activities of an adult civilisation.

It is difficult to avoid the two extremes of overpraise of the past and undue complaisance with the present. When I feel myself in danger of the former failing I remind myself of the free-conduct awarded by a learned judge to the field-mice, and when I suspect myself of undue satisfac-

¹ *The Criminal Prosecution and Capital Punishment of Animals*, page 111.

tion with modernity, I contrast the child's vision of beauty which found expression in fourteenth-century Venice with the adult disillusionment which has produced Baker Street and Bermondsey.

V

I am concerned in this book with the Victorian heresy in its various manifestations, and the reader may perhaps wonder why I have devoted so much space to Aquinas. I have done so because the contrast between the thirteenth and nineteenth centuries is so instructive. The flight from Reason is best studied against the background of an age which made reason the ultimate criterion of human knowledge. There is something childlike in the sunny confidence with which they trusted reason, unchecked by experiment, to solve all problems. In the last decade of the nineteenth century the process was reversed. The emphasis was on experiment and research, and close-knit reasoning on fundamentals was at a discount.

The scholastics, no doubt, overrated reason and underrated experiment. The *Summa Theologica* might have been written by a man who was blind from birth; for there is not a page in Aquinas's work which betrays any evidence of personal observation of Nature. The scholastics believed that they could discover how things functioned by means of a purely metaphysical analysis of the nature of things.

All this is very true, and yet science owes a debt to the scholastics which few scientists are prepared to admit. "The Middle Ages," as Professor Whitehead—whose authority to speak on behalf of science need not be disputed—remarks, "formed one long training of the intellect of Europe in the sense of order."¹

Professor Whitehead continues: "The greatest contribution of mediævalism to the formation of the scientific movement was the 'inexpugnable belief that every detailed occurrence can be correlated with its antecedents in a perfectly definite manner, exemplifying general principles'."

¹ *Science and the Modern World*, by Alfred North Whitehead, F.R.S., Sc.D. (Cambridge), Fellow of Trinity College, Cambridge.

. . . "The faith in the possibility of Science generated antecedently to the development of modern scientific theory is an unconscious derivative from medieval theology."

Again, whatever may be our verdict on scholastic philosophy, there is no disputing the value of the mental discipline of the medieval schools. The philosopher who had been moulded by that discipline learnt, at least, that an *ipse dixit* was not an adequate substitute for an argument. Take one instance only. The Victorian scientist was never tired of proclaiming the supreme importance of truth, and the wickedness of accepting religious beliefs on insufficient evidence. Aquinas did not assume, but proved with great care the by no means self-evident proposition that truth is always to be preferred to falsehood. Again, the scholastic never used a word before he had defined the exact and accurate significance of that particular word.

No scholastic, for instance, could possibly have written the following sentence which occurs in a recent book *The Present and Future of Religion*. "Life then, I think of as an instinctive thrust or urge appearing initially in an alien environment, a dead world of chaos, blankness and matter."

A medievalist would never have used the word "life" without explaining exactly what he meant by it. It is doubtful whether Mr. Joad himself knew what he meant by "life" in this particular passage. He uses the word hopefully as if it carried its own explanation. What exactly does Mr. Joad mean by "an instinctive thrust or urge"? I do not know. Does Mr. Joad?

Aquinas began by facing the greatest of all problems "how does everything start?" The moderns tend more and more to evade this problem, a problem to which there are only two answers "God" and "I don't know."

Our modern sceptics are not courageous enough to announce their failure to solve the problem. Accordingly, they take refuge from the pain of thought in the cloudland of metaphor.

Mr. Joad, for instance, would be very unfashionable if he admitted the existence of a personal God, but apparently there is not restriction for personifying "life." "Life is purposive," continues Mr. Joad, "but its purpose is at first latent, and only rises into consciousness in the course of life's evolution and development." No medievalist could have been guilty of such depressing vagueness.

Scholasticism, at least, inculcated one valuable habit, a "habit" which, as Professor Whitehead remarks, "remained long after scholastic philosophy had been repudiated, the priceless habit of looking for an exact point and sticking to the point when found."

The medieval theologian may justly be accused, not of depreciating the importance of reason, but of assuming that reason unchecked by experiment was capable of solving all problems in the Heavens above and on the earth beneath.

Faith, Reason, Experiment. There is room for all three in religion. Faith is essential, not only in religion, but in every phase of mental activity, for complete scepticism does not work. It is by faith that the scientists believe in the reality of the external world, and no rational argument has yet been discovered satisfactorily to refute the lunatic who declared that the world exists only in his dreams. But though religion cannot survive without faith, a creed which asks for blind faith will never endure. The theologian may assert that there are truths beyond the power of human reason to comprehend, but he must not ask us to accept those truths until he has proved by pure reason the credentials of the authority which proclaims the truths in question.

Finally, religion must satisfy the experimental test. It must justify itself by the appeal to experience.

The medieval theologian, as we shall see in the next chapter, overrated the appeal to Reason, and underrated the appeal to experiment. The modern scientist is in danger of falling into precisely the opposite error.

Deductive and Inductive Reasoning

I apologise to the majority of my readers for the following note which is intended for the minority who are not quite clear as to the distinction between deductive reasoning and inductive reasoning.

A deductive or *a priori* reasoner deduces either from truths universally admitted, or from truths deduced from truths universally admitted, their necessary consequences. Thus Aquinas starting from the universally admitted truth that "it is certain and obvious to our senses that some things are in motion" proceeds to deduce the existence of God.

Inductive or *a posteriori* reasoning is the attempt to discover the nature of a General Law from its observed consequences.

Astronomers observed that certain planets did, in point of fact, move in elliptic orbits. They inferred by inductive reasoning that the movements of these particular planets was a consequence of a General Law that all planets move in elliptic orbits. Induction will thus often create a strong presumption in favour of a General Law, the proof of which depends on deduction or on mathematical processes. From the fact that certain planets move in elliptic orbits, it is impossible to infer with certainty that all planets must move in such orbits. Observation must be supplemented by mathematics in order to achieve exact proof.

Philosophy emphasises the value of deduction; Science of induction.

Throughout this book I have described those who tend to argue deductively as *a priorists*, and those whose opinions are mainly the result of observation as *inductive reasoners* or as *empiricists*.

CHAPTER II

THE DAWN OF EMPIRICISM

I

THE contrast between the medieval and the modern outlook may be illustrated by Galileo's retort to Sarsi. Sarsi maintained that motion invariably produced heat, and in support of this theory he quoted a statement, which he had seen in print (and which he therefore assumed to be infallible), that the Babylonians cooked eggs by whirling them in a sling. Galileo made the obvious reply that it would be perfectly easy to test the truth of this statement by repeating the experiment. Sarsi, we may be very sure, had never thought of that, for the very idea of appealing from authority and to experiment, and from *a priori* reasoning to empiricism was foreign to the medieval mind.

Galileo, like the modern scientists, was mainly interested in the "why", the medievalist with the "how" of phenomena. In other words, he was a teleologist. Teleology is the doctrine of final ends rather than of efficient causes. The teleologist explains phenomena, not by trying to discover how things work, but by attempting to show why things are. To the medieval thinker the "why" of natural phenomena was solved once you had discovered their usefulness to man.

Nature is the work of God, and since God made Man only a little lower than the angels, it was reasonable to deduce that Nature has been created purely for the benefit of Man. From this assumption the scholastics deduced that the best method of understanding Nature was to interpret Nature with reference to Man's eternal destiny.

Mr. T. W. N. Sullivan writes as follows:

"All things conspired together towards some divine end,

the merely spatial and temporal connections of phenomena were not considered to be of importance compared with their logical connections. Phenomena were regarded as exemplifying certain general logical principles and as serving a universal purpose."

This view long survived the Middle Ages. Ruskin was, perhaps, the last great teleologist. His "geology", if indeed it can be described as such, is gloriously medieval in outlook. Mountains, for Ruskin, were not the inevitable result of certain physical changes on the surface of the earth. No, they are appointed to fulfil "three great offices", which he proceeds to describe in detail, "in order to preserve the health and increase the happiness of mankind." Nor is their arrangement haphazard. The great peaks are set back on a vast Alpine plateau. They "are not allowed"—a teleological phrase—"to come to the edge of this plateau for fear lest the stones and snow-slides from their slopes should fall on inhabited ground and cause death and destruction." "It is hardly necessary to point out," adds Ruskin, "the perfect wisdom and kindness of this arrangement as a provision for the safety of the inhabitants of the high mountain regions." Aquinas himself might have concluded as Ruskin concludes, "Now that such a structure is the best and wisest possible is indeed a sufficient reason for its existence and to many people it may seem useless to question further respecting its origin."

II

There is, of course, no necessary connection between the attitude of the teleologist and the attitude of the apriorist. It is, for instance, arguable, that Darwin's theory of Natural Selection was based on "a logical syllogism rather than on an observed sequence in the course of events."¹ But Darwinism, even if apriorist in origin, was rigidly anti-teleological in tendency.

In the ancient and in the medieval world, however, the

¹ *Milum.*

apriorist was almost invariably a teleologist, and the opposition to teleology came from the empiricists.

I do not wish to suggest that there is no place for a priori reasoning in science or in religion. The apriorist and the empiricist have their proper rôle.

Euclid, for instance, provides the supreme example of the value of a priori reasoning. Some of his theorems may conceivably have owed their origin to observation or even to experiment, but they are not presented to the reader as the result of inductive, but rather of severely deductive reasoning. Euclid and geometry represent the triumph of deductive logic.

The Greeks were attracted by mathematics, especially by geometry, but, with few exceptions, they did not take kindly to the discipline of patient and systematic observation. They were interested in the great general questions: "What is the basis of the physical world? Water? Fire? Or a perpetual flux?" They were too preoccupied by these general problems to concern themselves greatly with specific problems.

The development of science along observational and experimental lines was checked by the great influence of Socrates. Socrates (470-399 B.C.) assumed a position of scepticism with regard to the validity of all human knowledge. He was interested in ethics rather than in physics, and he neglected, as Aristotle remarks, the world of Nature. His supreme interest was in conduct. Plato followed his master in concentrating on the ethical motive. His book *Timaeus* gives us, according to Dr. Singer, "a picture of the depths to which natural science can be degraded in the effort to give a specific teleological meaning to all parts of the visible Universe. . . . In its decay Platonism dragged science down and destroyed by neglect nearly all earlier biological material. . . . The mighty figure of Aristotle (384-322) stayed the tide for a time."¹

¹ The quotation is from Dr. Charles Singer's contribution to *Science, Religion and Reality*. (Sheldon Press.) See also the most interesting contributions to *The Legacy of Greece* by Dr. Singer and Professor D'Arcy Thompson. (Oxford University Press.)

Aristotle was a great naturalist. He had a genius for observation and displayed in his work a marvellous knowledge of the animal kingdom, more especially of fishes, knowledge based on close and careful observation. But though observation was the dominating influence in the development of his system, the system itself had constantly to be readjusted to suit the requirements of certain a priori beliefs which Aristotle made no attempt either to prove or to check by observation, or indeed by reason.

Thus the fundamental bases of the Aristotelean system of physics depended among other things on the following beliefs:

That all matter is made up of the four elements, Earth, Air, Fire and Water. That the earth is at the centre of the Universe which is itself spherical, and that the circular movement is the most perfect conceivable, and that for this reason the stars and planets move in concentric circles round the earth.

The influence of these views on Kepler will be noted in due course.

It was in medicine that the empiricists won their first victories. The Hippocratic Collection contains a tract *Upon Ancient Medicine* which is a spirited challenge to the apriorists. Medicine, so runs the argument, should be an empirical art based on observation collected from a careful study of disease, and should not be founded on a priori generalisations about the nature of disease in general. Ridicule is poured on the contemporary belief that a man can know nothing of medicine unless he knows how a man came into existence, and the substances of which man was compounded at the beginning.

Empedocles, again, was an empiricist. He had challenged the contemporary bias towards teleological explanations, and had contended that we have no right to assert that the rain falls to make the corn grow in spring, rather than to spoil the autumn sheaves. The rain "cometh when it listeth" or "of necessity." Again, our teeth grow by the operation of natural law. Their "fitness for

cutting and grinding is not purposeful, but coincident." "And Empedocles proceeds," writes Professor d'Arcy W. Thompson, "to the great evolutionary doctrine, the clear prevision of Darwin's philosophy, that fit and unfit arise alike, but that what is fit to survive does survive, and what is unfit perishes."¹

Aristotle's works on biology were not recovered for the West until his logic had penetrated and permeated the universities. Of the classical writers on biology, Claudius Galen of Pergamon (A.D. 131–201) alone exercised an influence on the Middle Ages. Almost all that the world knew of biology and physiology up to the seventeenth century is contained in the works of Galen. The secret of Galen's influence and popularity in the Middle Ages is the fact that Galen was a teleologist; his outlook was in complete harmony with the theologians. "It was the Creator's infinite wisdom," writes Galen, "which selected the best means to obtain His beneficent ends, and it is a proof of His omnipotence that He created every good thing according to His design, and thereby fulfilled His will."

Ruskin might have put this quotation at the head of his famous chapter on "The Central Peaks."

III

Science ceases to have a history in the Middle Ages. A general statement of this kind can, of course, always be challenged. It is possible to cite instances of acute scientific observation, pregnant with hints of future discovery, in the works of the scholastics, such as Albertus Magnus. But an age must be judged by its master energies, and the intellectual energies of the Middle Ages were devoted, not to science, but to philosophy.

The case of Roger Bacon is sometimes mentioned by way of challenge to the accepted view. But the career of the unhappy Franciscan confirms the traditional verdict. Roger Bacon, pioneer of modern science though he was,

¹ *Legacy of Greece*, page 157.

was hampered in his search for truth, not only by the suspicions of his superiors, but also by the apriorist outlook of his age, an outlook from which he never wholly freed himself.

He was befriended, it is true, by an enlightened Pope who died, however, too soon to implement his promises of support. He was suspected of heresy and towards the end of his long life was imprisoned for a few years by his own Order on the charge that his teachings "contained suspicious novelties."

Bacon, it must be admitted, asked for trouble. He was aggressive and tactless. He made sweeping attacks on the great leaders of Catholic thought whom he accused of "puerile vanity and ineffable falsity." He did not confine himself to attacks on rival Orders. His pointed references to the great Dominicans, Albert and Aquinas, might have been forgiven, but his own Order came in for its fair share of abuse. "Nullum ordinem excludo," he exclaimed in a fine outburst of impartial invective.

Roger Bacon was the first thinker of modern Europe to base his system of natural knowledge on observation and on experiment. Like his great namesake, Francis Bacon, he advocated the experimental method, but unlike Francis Bacon he was himself an experimenter. He wrote a book on optics which was used as a textbook for two hundred years, and it is probable that he actually invented the primitive telescope which he described. He was an enthusiastic astronomer; the Gregorian Reform of the calendar was based on ideas which Bacon had advocated without success in his own day. He gives us the first-known description of the composition of gunpowder. He was keenly interested in all mechanical problems, and his writings contain pregnant hints of future discoveries:

"Machines for navigating are possible without rowers, so that great ships suited to river or ocean, guided by one man, may be borne with greater speed than if they were full of men. Likewise cars may be made so that without a draught animal they may be moved *cum impetu inæsti-*

mabili, as we deem the scythed chariots to have been from which antiquity fought. And flying machines are possible, so that a man may sit in the middle turning some device by which artificial wings may beat the air in the manner of a flying bird.”¹

Nor were his interests strictly confined to science in the strict sense of the term. He was the first to collect systematic data for a geography, and one of the first to insist on the importance of a scientific study of languages. He projected Greek, Hebrew and Arabic grammars, and laid down the principles of textual criticism which were not fully developed until the nineteenth century.

Roger Bacon was in some respects very modern, and in other respects a true child of the Middle Ages.

Nothing, for instance, could be more medieval than Roger Bacon’s insistence that all branches of knowledge must serve theology, and must find in that service their justification. The chief value of mathematics, so he tells us, is the light which it throws on many problems in the Holy Scriptures. The mathematician can, for instance, help to determine the exact position of Heaven and Hell, and the exact measurements of the Tabernacle, the Temple and the Ark. Roger Bacon could, indeed, be described as the spiritual father of the Anglo-Israelites; for, like the Anglo-Israelites, he believed that messages of great significance lay implicit in scriptural measurements.

Again, even in his hymn of praise to “experiment” he betrays the influence of his age.

“Experimental science,” he writes, “teaches experiri, that is to test by observation or experiment the lofty conclusions of all science . . . the *fidelis experimentator* has considered that the eagle, and the stag, and the serpent, and the phoenix prolong life, and renew their youth.” On which Dr. Taylor observes, “It may be pertinent to our estimate of Bacon’s experimental science to query where the *experimentator* ever observed an eagle or a phoenix renewing its youth.”

¹ Quoted by H. O. Taylor in *The Medieval Mind*, Vol. II, page 538.

These were, however, the limitations of his age, and in spite of those limitations Roger Bacon can clearly be described as the first man of science in the modern sense of the term.

"His legacy to thought," writes Dr. Singer, "may be regarded as accuracy of method, criticism of Authority, and reliance on experiment—the pillars of modern science."

Roger Bacon, indeed, was the first great empiricist of the Middle Ages. He has a far greater claim than his great namesake, Lord Bacon, to be considered the real Father of Modern Science.

Dr. Walsh, in his informative book *The Popes and Science*, cites Bacon's career in support of his general thesis that the Popes promoted the advance of science. Roger Bacon was an orthodox Catholic, as was Galileo, but it would be as reasonable to cite Galileo, who was imprisoned by the Inquisition, as Bacon, who was imprisoned by his own Order, in support of Dr. Walsh's thesis.

"Roger Bacon," as Dr. H. O. Taylor says, "was as one about whose loins the currents of his time drag and pull; they did not aid him, and yet he could not extricate himself."

On the other hand, I sympathise with Dr. Walsh's reaction to the popular misrepresentation of the attitude of the medieval Church. It is as unreasonable to represent the medieval Church as hostile to science, as to suggest that the medieval Popes were keenly interested in the advancement of scientific notions. The medieval Church was uninterested in, rather than hostile to science.

The intellectual energies of the great medieval thinkers were concentrated on philosophy. The neglect of science during the Middle Ages must be ascribed, not to the active opposition of the Church, but to the fact that the great churchmen were absorbed in other intellectual interests.

The Popes, indeed, were always prepared to patronise scientific discovery provided that the scientists did not

trespass on the province of the theologians. In the case of one famous theory, scientists were even permitted to treat as a convenient working hypothesis a theory which conflicted with the literal interpretation of the Scripture texts.

The theory in question, that the earth revolves round the sun, was first tentatively suggested by Nicholas Copernicus in his book, *De Revolutionibus orbium caelestium*, which was published in 1543 and which was dedicated to the Pope, Paul III.

This book, in which his theories are explained, owed its publication largely to the active interest displayed by Cardinal Shömberg and the Bishop of Culm. Neither Paul III nor the nine popes who followed him protested against the Copernican doctrine. In 1596, thirty years before Galileo got into trouble, the Protestant biological Faculty at the University of Tübingen censured Kepler for writing a book in support of the Copernican doctrine. They made things so unpleasant for Kepler that he fled, and to whom? To the Jesuits of Gratz who welcomed him warmly. Both Luther and Melanchthon inveighed against the blasphemy of a moving earth long before Rome itself was infected by this general alarm. Had Galileo been content to maintain the Copernican theory as a convenient hypothesis which explains phenomena in a simpler manner than the Ptolemaic, he would have been left in peace. He got into trouble because he invaded the sphere of the theologians and maintained that Scripture had blundered.

The decree of the Holy Office which censured these views was, of course, a great blunder. But it must be remembered that on the evidence available at the time the case for the Copernican system was by no means overwhelming. Huxley, who looked into the matter, came to the conclusion that on the available evidence "the Pope and the Cardinals had rather the best of it." Directly after the trial of Galileo, Cardinal Bellarmine, perhaps the most influential of the cardinals, sent a letter to Foscarini in which he said that had Galileo been content to show that his system explained celestial phenomena without denying the

truth of Scripture all would have been well. He added that if it could really be proved that the sun was fixed, a possibility which he clearly contemplated, it would be necessary to consider carefully the passages in Scripture which seemed to prove the contrary, and that it would be essential to admit that these passages had been misunderstood than "to pronounce that to be false which is demonstrated."

IV

Modern physical science is the result, not only of the substitution of an empiricist for an apriorist attitude, but also of the substitution of systematical measurement for philosophy, a revolution which is the theme of Chapter III. Before, however, discussing Copernicus, Galileo and Kepler, it is necessary to mention Lord Bacon.

Bacon was a philosopher rather than a scientist, and was not a particularly good philosopher; but he had, at least, the distinction of being the first clearly to formulate and proclaim the real difference between deductive and inductive reasoning. To do him justice, he never claimed to be a scientist, and described himself as a maker of bricks for others to build with. He believed that he had invented an infallible technique for scientific discovery. He was wrong. Modern Science is not built up by Baconian bricks, as Bacon himself might have learnt had he been more interested in the actual scientific discoveries of the day and less interested in the Baconian discovery of the Baconian key to the riddle of Nature.

As it was, Bacon never realised the importance of Napier's discovery of logarithms, and did not follow with any attention the great discoveries of Galileo and Kepler.

His admirers have claimed that he was the first to discover and to formulate the technique of scientific discovery.

The Baconian method may be briefly summarised as follows: The first step, so Bacon taught, was to collect as many facts as possible and over as wide an area as possible. All tentative theories as to the bearing of these facts had to

be postponed until a vast array of facts had been correlated. The discovery of new truth is the reward of induction, of a posteriori reasoning from facts rather than of a priori reasoning from baseless premises.

Bacon greatly overrated the power of induction. He believed that a mere collection of unrelated facts would tell their own tale and would suggest to the mind of the observer, duly trained in Baconian induction, the underlying truths to which they bear witness. The Baconian induction was supposed to give the trained observer as absolute a control over truth as a navigator's control over a ship. It was intended, as Mr. R. W. Church remarks, "to give all men the same sort of power which a pair of compasses gives the hand drawing a circle." The facts of Nature, so Bacon believed, tell their own story. All that was necessary was to discover the alphabet in order to read the Book of Nature at sight.

He believed that one set of men might be trained to collect the facts, and another set of men employed deducing with mathematical certainty the axioms implicit in those facts. The Baconian induction was intended to be a mechanical method of procedure which anybody could be trained to apply.

Needless to say, the Baconian method never has and never will produce any scientific results. The "humbug of Baconian induction," as Huxley calls it, has been a magnificent failure so far as practical results are concerned. The great pioneers of scientific discovery have arrived at their results by intuition and native genius. Bacon never allowed for the importance of guesses in the discovery of truth. As Huxley says: "Those who refuse to go beyond fact rarely get as far as fact; and anyone who has studied the history of science knows that almost every great step therein has been made by the 'anticipation of nature,' that is, by the invention of hypotheses, which, though verifiable, often had very little foundation to start with; and not unfrequently, in spite of a long career of usefulness, turned out to be wholly erroneous in the long run."

Bacon had a great contempt for the medieval scholastics, and would have been both surprised and shocked had he been described as the last of the scholastics, but his mental processes are scholastic rather than modern in temper. It is true that he preached the necessity of verifying theories by experiment, but his writings are full of errors which might have been avoided had he really practised what he preached. Arrows with wooden points, he tells us, penetrate further into wooden substances than arrows with iron points. Why? Thanks to similitude of substance. A characteristic scholastic touch.

The Baconian method itself was the product, not of induction, but of deduction. Bacon did not patiently collect all the available evidence as to how scientific discoveries had actually been arrived at, and then *induce* his own theory of scientific discovery from these facts. He never analysed the actual mental process like Harvey or Galileo. He was content to *deduce* his own theory of scientific discovery not from facts, but from premises which he never tested or checked.

Bacon was neither a metaphysician nor a scientist. He was not a clear and consistent reasoner in philosophy, and the method which he invented has never proved of the least practical value to scientists. Bacon's claim to greatness rests, not on the Baconian induction, but on the Baconian prose. He was a Romantic, and the vast range of unexplored human knowledge fired his imagination. The stately music of his magnificent prose proved to be a medium of unimagined power infecting the world with his own enthusiasm. Here is a characteristic passage:

"If, therefore, there be any humanity towards the Creator, any reverence for or disposition to magnify His works, any charity for man and anxiety to relieve his sorrows and necessities, any love of truth in nature, any hatred of darkness, any desire for the purification of the understanding, we must entreat men again and again to discard or at least set apart for a while, these volatile and

preposterous philosophies which have preferred theses to hypotheses, led experience captive, and triumphed over the works of God; and to approach with humility and veneration to unroll the volume of the Creation, and to linger and meditate therein, and with minds washed clean from opinions to study it in purity and integrity. For this is that sound and language which 'went forth into all lands,' and did not incur the confusion of Babel; this should men study to be perfect in, and becoming again as little children condescend to take the alphabet of it into their hands, and spare no pains to search and unravel the interpretation thereof, but pursue it strenuously and persevere even unto death."

It is in passages such as these that we must seek for the secret of Bacon's influence. The scientist may pretend to be a dull fellow absorbed by concrete facts, but a poet speaks in the heart of every true scientist, and it was to the poet rather than to the scientist that Bacon, in effect, appealed.

CHAPTER III

PROTESTANT EMPIRICISM

"THE Reformation and the scientific movement," writes Professor Whitehead, "were two aspects of the historical revolt which was the dominant intellectual movement of the later Renaissance. The appeal to the origins of Christianity, and Francis Bacon's appeal to efficient causes as against final causes, were two sides of one movement of thought. . . . It is a great mistake to conceive this historical revolt as an appeal to reason. On the contrary, it was through and through an anti-intellectualist movement."

The Protestantism of Luther was certainly an appeal from the head to the heart, a very sensible revolt against "the rationalistic orgy of the Middle Ages," and Professor Whitehead might have pushed his stimulating analogy between the Reformation and the scientific movement even further than he has done, for both movements owed their success to the new emphasis on experiment.

Luther called on his followers to forget the dusty syllogisms of the scholastics. He appealed to experience, to the believer's conviction of Christ's presence and influence, to the faith that was the product, not of philosophic argument, but of the great experiment of the Christian life. The Protestant appeal to experience is analogous to the scientific appeal to experiment. Luther in effect contrasted justification by faith not only with justification by works, but also with justification by reason. The new emphasis was on the inner life of the individual, on the faith that represented an induction from experience rather than a deduction from general truths. The young Moravian

Böhler, to whose influence Wesley attributed his conversion, was in this, at least, a true child of the Lutheran Reformation. Wesley, a typical product of that eighteenth century which, like the thirteenth valued reason above emotion, had attempted to justify his own creed by reasoned argument. Böhler listened patiently and replied much as Luther would have replied to a disciple of Aquinas, "My brother, that philosophy of yours must be purged away."

Protestantism is often represented as a mere appeal from the infallible Church to the infallible Bible. This is a crude simplification of the real facts. Luther certainly appealed to the Bible in support of his views, but in this he was merely following the scholastic precedent. To test a particular doctrine by an appeal to Scripture is a very different matter from assuming that every word of Scripture must be true. Luther, indeed, expressly stated that he did not consider himself bound to accept the literal accuracy of every incident as reported in the Bible. "What if Moses never wrote it?" was his comment on Genesis.

Luther was far less of a literalist than Aquinas. Luther did not, but Aquinas did believe in the literal accuracy and literal inspiration of the Bible. It is true that Aquinas conceded that Biblical metaphors need not always be taken literally. "When God speaks of God's arm, the literal sense is not that God has such a member, but only what He signifies by this member, namely operative power." But "with Aquinas, the letter comes first," writes Father Hugh Pope . . . "the more literal opinion is always to be preferred."

Nor was Aquinas unique in this respect. Persecution was justified by a literal interpretation of the text 'Compel them to come in.' The terrors of Hell Fire were accepted because the theologians took certain words of Christ in their literal sense. Private property was defended against the communism of the spiritual Franciscans on the ground that Christ when speaking to Peter said, "Put up *thy* sword," and not merely "Put up *the* sword," from

which it follows that Peter possessed at least one piece of private property.

Luther appealed to the Bible because it was the only authority which both Catholic and Protestant were prepared to accept, and because both Catholic and Protestant were expected to justify their respective positions by quotations from its pages.

Luther and Calvin were chiefly concerned to defend their own interpretation of Christianity rather than Christianity itself and, consequently, a Christian who relied exclusively on their works would be defenceless in controversy against a modern atheist or an agnostic. The positions which they left undefended were strengthened against attack by the great Protestant theologians, Bishop Butler, Paley, Salmon and Lightfoot among others. These men were the heirs of two great traditions, the Protestant appeal to experience and that Catholic appeal to reason. Indeed, the distinction between Catholics and Protestants in this respect is one of emphasis. The Catholic does not disdain the argument from experience, and the modern Protestant certainly does not reject the appeal to reason. Paley appreciated to the full the value of sound deductive reasoning from sound premises. Salmon's defence of the New Testament contains arguments some of which were advanced for the first time by St. Augustine. Bishop Lightfoot's masterly reply to the anonymous author of *Supernatural Religion* would have given equal pleasure to Aquinas and to Luther.

CHAPTER IV

QUALITAS-QUANTITAS

THE transition from medieval scholasticism to modern science is marked, not only by the tendency to substitute inductive for deductive reasoning, but also by the ever-increasing importance attached to measurement, and to the ever-growing conviction that science consists only in metrical knowledge. Measurement gradually takes the place of syllogisms, mathematics of logic.

Roger Bacon was, perhaps, the first to assert that Nature was susceptible of mathematical description. Leonardo da Vinci preached the same doctrine. He asserted that both experiment and observation must be tested by means of mathematical demonstration. Certitude, he declared, could not exist "where some one of the mathematical sciences cannot be applied."

The year 1543 marks, according to Dr. Singer, the endpoint of medieval science. In that year two works, modern in outlook and both based on the experimental method, were published. The "*De Fabrica corporis humani*" of Vesalius, and the "*De Revolutionibus orbium cœlestium*" of Copernicus.

The Copernican theory represents the first serious attempt in modern Europe to apply a mathematical criterion to Nature.

According to the Ptolemaic system the earth was stationary and situated at the centre of the universe. Round the earth the planets and the sun revolved in circular orbits with unvarying velocities. Observation soon showed that

the path of a planet in the sky is neither simple nor apparently circular. This difficulty was met by assuming that the planet itself moved round the circumference of a small circle, and the centre of this small circle moved with unvarying velocity round the circumference of a large circle. This solution in turn broke down, and finally a whole series of circles had to be invented in order to preserve the principle of a fixed earth round which the planets revolved.

Copernicus discovered that if the earth was permitted to move, the mathematical explanation of the planets in motion was vastly simplified.

Copernicus originally put forward his theory merely as a mathematical device for representing in the simplest possible fashion the celestial phenomena. "Mathematics is written for mathematicians," he explained, "to whom my labours, if I am not mistaken, will appear to contribute something."

Modern science has adopted Copernicus's view that the universe lends itself to mathematical description, but it does not regard the mathematical relations thus established as the *Cause* of phenomena. Kepler revived the mathematical mysticism of Pythagoras. He believed that the universe was not merely explicable in mathematical terms, but is itself governed by mystical mathematical relations. At that time only six planets had been discovered. Kepler was immensely elated when he found that the "five regular solids" could be inserted between the spheres of the six planets. He believed that this fact, which even if it was true we should regard as absolutely irrelevant, was sufficient explanation of the planets being six in number. This in itself provides an interesting example of the conflict between the apriorist and empiricist standpoint. Kepler was influenced by apriorist considerations when he endeavoured to prove that the orbit of the planets was circular. At that time it was considered more dignified for a heavenly body to follow a circular orbit than an orbit in the shape of an ellipse. The circle was considered to possess more "perfection." Kepler made eighteen successive

attempts to adapt the planetary movement to circular orbit before he finally adopted ellipses. The empiricist finally triumphed over the apriorist. "His faithfulness to observation," as Mr. Sullivan puts it, "overcame the æsthetic preferences."

The modern scientist, in general, is less successful than Kepler in subordinating his æsthetic preferences to the test of observation. He no longer applies the æsthetic criterion to the movement of the heavenly bodies, but he is tempted to rule out an entire class of phenomena purely because they offend his æsthetic standards. A tambourine floating in mid-air contradicts his apriorist convictions that the natural order is never undignified. The trivial phenomena of the séance room affects modern science much as a planet deviating from its circular orbit affected Kepler.

Modern physical science is largely the result of a successful attempt to describe all phenomena mathematically. It was Copernicus, Galileo and Kepler who inaugurated the crusade to substitute measurement for a priori reasoning.

Newton, again, whose great achievement was to prove that one and the same law rules throughout the universe, that the force which causes the apple to fall in the orchard is the same force which controls the movements of the nearest planet and the most distant star, had an immense faith in mathematics as the final test of truth. "The certainty of a mathematical demonstration" was indeed the only certainty which he recognised as absolute.

Science, as we have seen, made no progress so long as the intellectual energies of men were devoted to a priori reasoning. Science advanced with astounding rapidity directly men began to *measure*, but the very success of measurement engendered that absurd delusion, the foundation of the Victorian heresy, that everything is measurable, and that nothing which is not measurable is real. The Victorian materialist looked forward with confidence to

the day when the beauty of a landscape or a painting could be expressed in terms of a mathematical formula.

Science deals with things that can be measured, and the things which can be measured are of far less importance to man than the things which cannot be measured, such as happiness, heroism, sanctity and beauty, all of which escape the metrical test.

Science, in other words, deals with the relatively unimportant aspects of life, a fact which scientists are always in danger of forgetting.

"The fact is," as Sir Bertrand Windle said, "that Duhem was abundantly right when he asserted that if the Middle Ages exaggerated the importance of *Qualitas*, as for a time they certainly did, our day has equally exaggerated the importance of *Quantitas*."

CHAPTER V

THE EARLY EVOLUTIONISTS

THAT Darwin discovered "evolution," and that the word "Darwinism" may properly be used as the equivalent for the theory of evolution is a vulgar error.

Evolution in the widest sense of the term is an obvious fact of human experience. The baby evolves into the man, and the acorn into the oak. The term "evolution" is, however, often used in the more restricted sense to signify the transformation of species by descent. And even in this restricted sense, evolution is not a modern doctrine. The resemblance between a donkey and a horse would suggest to any thinking man the possibility of a common ancestor, and once that point had been reached, it was not a very big step in advance to wonder whether animals which resembled each other less closely than the donkey and the horse might also have had a common ancestor. And indeed such speculations were common in the ancient world.

The scholastic doctrine of mediate creation is tolerant of an evolutionary interpretation. The Universe, according to this view, came into being as the result of a *supernatural* act of *direct* creation. Modern forms of life have, however, developed according to *natural* law from the primordial forms and are an example of *mediate* creation.

St. Augustine has been claimed, with great plausibility, as an evolutionist on the strength of certain passages in his work in which he certainly appears to teach that God created the various species by endowing the original matter with power to evolve them.

There is certainly an evolutionary flavour in the following passage which occurs in his book on Genesis:

"Sicut autem in ipso grano invisibiliter erant omnia simul, quae per tempora in arborem surgerent; ita ipse mundus cogitandus est, cum Deus *simul omnia creavit*, habuisse simul omnia quae in illo et cum illo facta sunt quando factus est dies; non solum coelum cum sole et lunâ et sideribus . . . sed etiam illa quae aqua et terra produxit potentialiter atque causaliter, priusquam per temporum moras ita exorirentur, quomodo nobis jam nota sunt in eis operibus, quae Deus usque nunc operatur."

The modern scientific form of the doctrine of evolution cannot, however, be traced further back than the seventeenth century. The mutability of species was a hypothesis certainly present to the mind of Descartes, of Spinoza and of Leibnitz as passages in their works clearly prove. During the eighteenth century evolutionary theories were widely discussed in European scientific circles.

Those who have read Samuel Butler's book *Evolution Old and New*, a book which summarises the evolutionary theories of Buffon, Erasmus Darwin (Charles Darwin's grandfather) and Lamarck will find the greatest difficulty in understanding how Darwin could ever have permitted the public to credit him with the discovery of evolution.

"The pre-eminent claim of Buffon," writes Butler,¹ "to be considered the father of the modern doctrine of evolution cannot be reasonably disputed, though he was doubtless led to his conclusions by the works of Descartes and Leibnitz, of both of whom he was an avowed and very warm admirer. His claim does not rest upon a passage here or there, but upon the spirit of forty quartos written over a period of about as many years. . . . Buffon was the first to point out that, in view of the known modifications which had been effected among our domesticated animals and cultivated plants, the ass and the horse should be considered as, in all probability, descended from a common ancestor; yet, if this is so, he writes—if the point were once

¹ *Unconscious Memory*, by Samuel Butler. (A. C. Fifield.)

gained that among animals and vegetables there had been, I do not say several species, but even a single one which had been produced in the course of direct descent from another species; if, for example, it could be once shown that the ass was but a degeneration from the horse, then there is no further limit to be set to the power of Nature, and we should not be wrong in supposing that, with sufficient time, she has evolved all other organised forms from one primordial type,"¹ (*et l'on n'auroit pas tort de supposer, que d'un seul être elle a su tirer avec le temps tous les autres êtres organisés.*)

Evolution, or in Buffon's own words "the alteration and degeneration of animals," must be attributed "to temperature and climate, quality of food and the ills of slavery."

Buffon was born in 1708 and died in 1788. Charles Darwin's grandfather, Erasmus Darwin, was Buffon's junior by a quarter of a century (1731-1802). He was an ardent believer in evolution, and his theory of evolution marked a great advance on Buffon's.

According to Buffon evolution was due simply and solely to the effect of the environment on the animal. The animal was the victim of its own environment. According to Erasmus Darwin, evolution might be represented as the result of a co-operation between the animal and its environment. The environment evoked new needs, and it was the attempt on the part of the animal to supply those new needs which produced new habits, and these new habits in turn produced new organisms.

Lamarck, the great French naturalist (1744-1829), elaborated in far greater detail a very similar theory of evolution. There is no direct evidence that Lamarck ever read a line of Erasmus Darwin's writings, but the similarity between their views is so striking that it is difficult not to credit Lamarck with some knowledge of Erasmus Darwin's theories.

Lamarck emphasised the important rôle played by use

¹ *Evolution Old and New*. Quoted from Buffon, tom. IV, page 383, ed. 1753.

and disuse, by use in strengthening a particular limb or organ, and by disuse in producing the decay of a limb. The development of the blacksmith's arm is an obvious instance of the effect of "use." Lamarck accounted for evolution as follows. He contended that great changes in environment involved changes in the needs and wants of the animals. If these wants become permanent or of long duration, the animal will contract new habits which will last as long as the wants which gave rise to them. "On the other hand, new wants have rendered a part necessary, which part has accordingly been created by a succession of efforts; use has kept it in existence, gradually strengthening and developing it till in the end it attains a considerable degree of perfection. On the other hand, new circumstances having in some cases rendered such or such a part useless, disuse has led to its gradually ceasing to receive the development which other parts attain to; on this account it becomes reduced and in time disappears."

According to Buffon, and according, as we shall see, to Charles Darwin, the animal may be regarded as the passive mould on which environment impresses its signature. According to Lamarck, changes are brought about by the fact that the animal consciously and intelligently adapts itself to its own environment.

Lamarck believed that all that had been acquired "in the organisation of individuals in the course of their life is conserved by generation and transmitted to the new individuals which proceed from those which have undergone those changes."

The great objection to the Lamarckian theory is the doctrine, first enunciated by Weissmann, and widely accepted to-day, that acquired characteristics cannot be inherited. If this be true, Lamarck was mistaken when he urged that the effect of use and disuse could be "conserved by generation and transmitted to new individuals."

The general conclusions at which Lamarck arrived were very similar to Charles Darwin's. They differed radically as to the *modus operandi* of evolution, but they both

believed that the differences between the various species of animals and plants could be explained by the slow, gradual accumulation during many successive generations of extremely small variations.

And in view of the similarity of their main conclusions, the unbiased critic, whether he reads Lamarck himself or the admirable summary of Lamarck's views in Samuel Butler's book, will, I think, share the surprise expressed by the great French scientist Delage that "Darwin did not recognise in Lamarck's doctrine the transmutation idea which served as a basis for his own theory."

CHAPTER VI

THE ORIGIN OF SPECIES

WHETHER the pen is more or less mighty than the sword is a matter of opinion, but among the books which have played a greater part in shaping our European culture than most battles are the *De Revolutionibus orbium cælestium* of Copernicus, which was published in 1543, and Charles Darwin's *Origin of Species*, which was published in 1859.

There is no doctrine of the Church which is inconsistent either with the Copernican system or with the doctrine of evolution, but it would be idle to deny that both Copernicus and Darwin were responsible for a reorientation in the religious life of their day.

Medieval man was at home in the universe, a universe of which the earth was the centre, a universe which was created to serve the needs of man. The earth had been the basis of that universe, until Copernicus proved that it was nothing more than a minor planet wandering through the empty corridors of space. The universe thus revealed was friendless and inhospitable.

The Garden of Eden still remained. The universe might be terrifying in its immensity, but the mind of man could still anchor itself within the homely limits of measurable time which separated him from his first ancestor in the Garden of Eden.

Darwin performed the same sad service for time that Copernicus had performed for space. The Garden of Eden receded in time just as the roof of Heaven had receded into space. Evolution proved even more potent as a solvent of traditional doctrines than the heliocentric astronomy of Copernicus.

Darwin, as we have seen, was by no means the first to preach evolution, nor was his theory of the *modus operandi* of evolution an improvement on that of his most brilliant predecessor, Lamarck, nor does much survive to-day of the distinctive doctrines which he preached.

The importance of Darwin was due, not to any truths which he discovered, for he saddled the theory of evolution—which is probably true—with an explanation which is almost certainly false.

Darwin is important in the history of thought because he was the first to popularise evolution and to transform that theory from the by-product of the study into a world-wide force whose influence is still felt in every department of human thought.

Charles Darwin, who was born in 1809, and who died in 1882, came of evolutionary stock. He had read the works in which his grandfather Erasmus Darwin set forth his views of evolution, but these works produced little effect on his mind. It was the theories of Malthus, and the observations which he made on the voyage of the *Beagle* and not the works of Erasmus Darwin or Lamarck, which transformed Charles Darwin into an evolutionist.

The turning-point in Darwin's life was his appointment as naturalist in the *Beagle* just as she was about to start on a surveying expedition. The voyage lasted from December 27th, 1831, until October 2nd, 1836, and in the course of it Darwin visited the Cape de Verde and other Atlantic Oceanic islands, surveyed the South American coast, afterwards visiting Tahiti, New Zealand, Australia, Mauritius, Brazil and the Azores.

Darwin had a genius for patient systematic observation, and on this voyage the observations which he made on the relations between animals on islands and those in the nearest continental areas, all helped to turn his mind to the problem of the modification of species.

Darwin was a man of private means; when he returned to England he had all the leisure he needed to work at the collections which he had brought back from the voyage.

His pocket-book for 1837 contains the following sentence: "In July opened first note-book on Transmutation of Species."

In 1839 he married Emma Wedgwood. Throughout his life he suffered from almost continual ill-health, and he would never have found it possible to achieve all that he did achieve had it not been for the devoted protection of his wife.

In October 1838 Darwin read Malthus's *Essay on Population* and was much impressed by his presentation of the struggle for existence. He at once deduced: "That under these circumstances favourable variations would tend to be preserved, and unfavourable ones to be destroyed. The result of this would be the formation of new species. Here, then, I had a theory by which to work."

Malthus, an Anglican priest, had tried in his *Essay on Population* to prove that man multiplies with a rapidity which outstrips the means of sustenance. If this is true of man, argued Darwin, it must be even more true of animals and plants which multiply much more rapidly. Now there is no evidence that the number of animals and plants in the world have materially increased from year to year, and, consequently, an eliminating agent must be at work, for otherwise the earth would be covered by innumerable swarms of animals.

It was in this struggle for existence that Darwin discovered the eliminating agent which his theory required. The means of sustenance are limited, and the competition for these limited means is very severe. The successful competitors survive, the less successful tend to die out. Malthus had given the clue and Darwin deduced that favourable variations are preserved and unfavourable variations are destroyed.

"The result would be," wrote Darwin, "*the formation of a new species.*"

Here we have an outline of the famous theory of natural selection.

Darwin's famous book is usually referred to as *The*

Origin of Species. Its full title was *On the Origin of Species by Means of Natural Selection, Or the Preservation of Favoured Races in the Struggle for Life.*

The argument of this book may be summarised as follows:

Individual members of a species vary. The variations may be slight, but they are none the less real, and moreover these variations affect the survival chances of particular individuals. Some individuals will be fleetier than others, and therefore better able to escape from their enemies. Other individuals will be slightly better protected against the cold and will therefore have more chance of surviving an unusually cold winter. The progeny of favoured individuals will inherit the qualities which enabled their parents to compete with success in the struggle for existence.

The gradual and progressive accumulation of small variations would produce, first a distinct variety, and secondly a distinct species, in other words gradually transform one type of animal or plant into a totally different type of animal or plant.

In each generation the individuals who are less fitted to survive will die off more rapidly and thus presumably leave fewer progeny, whereas their slightly more fortunate rivals will live longer and consequently presumably leave a larger progeny.

Only a limited number in each generation will survive to procreate their offspring, and those which survive will perpetuate the advantages which enabled them to compete successfully. The gradual accumulation of infinitesimal differences will thus, in the course of geological time, produce all the varieties of living form.

"The pivot upon which the argument for evolution rested and by which it conquered men's minds, was a train of thought, logical syllogism, rather than an observed sequence of events in the course of Nature."¹

A mindless environment blindly selected by a mechanical

¹ *Evolution and the Spirit of Man*, by J. Parton Milum, B.Sc., Ph.D.

process the mindless organism best fitted to survive. Intelligence, mind and purpose were banished from the universe by this view.

The difference between Darwinism and Lamarckianism may be illustrated by the example of the giraffe.

According to Darwin, the long neck of this animal would be explained as follows: In times of drought or famine, herbivorous animals with necks slightly longer than other individuals in that species would be able to reach the leaves of high branches which were out of reach to their less fortunate rivals. Consequently, animals with slightly longer necks have more chance of surviving than those with slightly shorter necks. The former would tend to survive and procreate offspring and the latter to die. The process would be repeated in each generation with the result that the average length of neck in each generation would tend to increase slightly, thus producing the giraffe in the course of geological ages.

Lamarck, on the other hand, would explain the giraffe's neck partly as the result of "use," partly as the reward of effort. The giraffe that keeps on stretching its neck develops a long neck, much as a blacksmith develops muscles in his arm. The giraffe that refuses to be beaten, that persists in trying to get the foliage just beyond its reach, will be rewarded by the acquisition of a long neck.

According to Lamarck the more intelligent and the more persistent giraffes select themselves, so to speak, and survive as a reward for their efforts. According to Darwin, Natural Selection blindly selects in each generation the giraffes who happen to be endowed, not as the result of their efforts but by chance, with rather longer necks than their rivals. According to Lamarck the long neck is the prize awarded to the best trier at the end of the race. According to Darwin, the long neck is the equivalent, say, to a start of fifty yards in a mile race, and it is pure chance which decides which competitors are to receive this start.

"Stripped of detail," writes Samuel Butler, "the point

at issue is this: Whether luck or cunning is the fitter to be insisted on as the main means of organic development. Erasmus Darwin and Lamarck answered this question in favour of cunning. They settled it in favour of intelligent perception of the situation—within, of course, ever narrower and narrower limits as organism retreats farther backwards from ourselves—and persistent effort to turn it to account. They made this the soul of all development whether of mind or body.

"And they made it, like all other souls, liable to aberration both for better and worse. They held that some organisms show more ready wit and *savoir-faire* than others; that some give more proofs of genius and have more frequent happy thoughts than others, and that some have even gone through waters of misery which they have used as wells."

Butler declared that he could no more believe that the adaption of structures to needs throughout Nature, adaptions with the most delicate ingenuity, were the result of gratuitous accumulation of favourable variations than he could believe that a mouse-trap or a steam-engine "is the result of the accumulation of blind minute fortuitous variations in a creature called man, which creature has never wanted either mouse-traps or steam-engines, but has had a sort of promiscuous tendency to make them, and was benefited by making them, so that those of the race who had a tendency to make them survived and left issue, which issue would thus naturally tend to make more mouse-traps and more steam-engines."

Both Lamarck and Darwin failed to explain the comparative rarity of long-necked animals, for it is difficult to understand, as Darwin himself admitted, why the long neck which has proved so useful to the giraffe should apparently have no survival value excepting for giraffes.

"Why, in other parts of the world," writes Darwin, "various animals belonging to the same order have not acquired either an elongated neck or a proboscis, cannot

be distinctly answered; but it is as unreasonable to expect a distinct answer to such a question, as why some event in the history of mankind did not occur in one country whilst it did in another."

A weak answer. The good historian will not rest content until he can explain why a particular event does occur in one country rather than in another. De Tocqueville, for instance, devotes the opening chapter of his great work on the French Revolution to explaining why the Revolution broke out in France rather than in Germany in spite of the fact that the peasantry were, if anything, worse off in Germany than in France.

Certain events must, from their very nature, be unique. The Incarnation could only take place at a given moment in time and at a given point in space. If Christianity be true it would be absurd to expect the Incarnation to have taken place in more countries than one, but if Darwinism be true there is nothing unreasonable in expecting a simultaneous outcrop of animals with giraffe-like necks all over the world. If the Darwinian hypothesis be correct, Natural Selection, if it operates at all, must operate universally. The Darwinian hypothesis would have been stillborn had Darwin admitted that its effects were local.

In this chapter I have confined myself to the early development of Darwin's theory and to the main points of difference between Darwinism and the doctrines of his predecessors. In the chapters that follow I shall outline the case against Darwinism.

CHAPTER VII

THE ESSENCE OF DARWINISM

BEFORE criticising Darwinism it is necessary to define certain terms which will recur again and again in the following chapters.

CHANCE

Huxley declared that "none but parsons believed in chance."

"Probably the best answer to those who talk of Darwinism, meaning the reign of 'Chance,' is to ask them what they themselves understand by 'chance.' Do they believe that anything in this universe happens without reason or without a cause?"

Huxley then proceeds to paint a word-picture with which we need not trouble the reader, of a seashore on which a heavy storm is breaking. "Surely here, if anywhere," continues Huxley, "he (the believer in 'chance') will say that chance is supreme. . . . But the man of science knows that here, as everywhere, perfect order is manifested; that there is not a curve of the waves, not a note in the howling chorus, not a rainbow-glint on a bubble, which is other than a necessary consequence of the ascertained laws of Nature; and that with a sufficient knowledge of the conditions, competent physico-matematical skill could account for, and indeed predict, every one of these 'chance' events."

Our putative parson, whose belief in chance provoked this illogical outburst, would, no doubt, reply that he meant by "chance" very much what Darwin meant by "fortuitous" in the expression "fortuitous variations";

what a mathematician means when he discusses "the theory of chances"; what a barrister means when he asks the jury to consider whether the arsenic in the corpse found its way there by chance or as the result of evil design; and, in brief, what all instructed people who use words in their proper sense mean by the word whose true meaning so signally eluded Huxley.

The word "chance" need not disappear from the vocabulary of a rigid determinist. Even if every event could be predicted a very proper distinction could still be drawn between events which were the result of chance, and events which were designed.

In the course of a recent walk I noticed a cloud which "by chance" had assumed a shape very similar to that of India on the map. I did not assume that there was any sinister connection between the shape of the cloud and recent events in India. I ascribed the resemblance, which was very striking, to "chance."

On another occasion, I watched an aeroplane emitting smoke-clouds which formed in the sky the words "Daily Mail." I ascribed the shape of these clouds, not to chance, but to purpose.

If you ask for a definition of chance and purpose, you cannot better the definition which you will find in *The Old Riddle and the Newest Answer*.¹

"By 'chance' is meant the concurrence, unguided by Purpose, of independent forces to produce a definite effect. 'Chance' denotes the absence of Purpose, as 'Vacuum' denotes the absence of air."

EVOLUTION

It is difficult to avoid using the word "evolution" in the loose popular sense as the equivalent of genetic transformism. By "the theory of evolution" most people mean the theory that one species has been transformed into another species by descent.

¹ By John Gerard, S.J. (Longmans & Co.)

Nobody, of course, denies the procession of living things from simpler to more complicated forms. That plants appeared on the surface of the earth before man is the irresistible deduction from the geological record, and is also in harmony with the account of creation given in the first chapter of Genesis. It is, however, important to realise that evolution does not necessarily imply genetic evolution. The evolution of the fleet from the Battle of Trafalgar to the Battle of Jutland is not an example of genetic evolution. If, however, man is descended from an ape-like ancestor, he owes his present form to the process of *genetic* evolution. The distinction between succession and descent is vital. James I succeeded Elizabeth. Edward VII both succeeded and was descended from Queen Victoria.

Many of the arguments for evolution are based on the established, but unjustifiable, assumption that succession implies descent, or, in other words, that evolution implies genetic evolution.

In the following chapters I use the expression "genetic evolution" whenever it is necessary to insist on this distinction, but in general, I shall follow the practice popularised by our leading scientists of using the word "evolution" in its narrower sense of genetic evolution.

DARWINISM

By Darwinism is meant, not the theory of genetic evolution, but the theory that the transformation of species is brought about by Natural Selection.

Nobody denies that Natural Selection weeds out the individuals least fit to survive, and encourages the survival of the fittest. Every farmer knows that the sheep with the biggest fleeces will have the best chance of surviving an unusually severe winter. Mankind discovered this self-evident truth many thousands of years before Darwin was born.

By Darwinism is meant not the truism that the fittest to survive do survive, but the theory that the survival of the

fittest is the chief cause which determines the transformation of one species into another.

Darwin's credo, which he firmly held in moods of buoyant faith, and to which he returned after moods of sceptical depression, was his firm faith in the all-sufficiency of Natural Selection to produce new forms. In the concluding sentences of his book *The Variations of Animals and Plants under Domestication* he elaborated a striking metaphor in which he compared Natural Selection to a human builder.

Natural Selection, Darwin argued, may be said to create new species out of fortuitous variations as truly as a man may be said to create a building out of the material provided by stones of various shapes.

It is important to insist that Darwin believed in the all-sufficiency of Natural Selection as the explanation of evolution. Now that Darwinism, in the proper sense of the term, is becoming more and more discredited, Darwin's admirers emphasise those passages in his writings which show a distinct Lamarckian tendency, as if Darwin was uneasily conscious that Natural Selection was less all-powerful than he had at first hoped. But the student of religious psychology will not be misled by Darwin's fluctuating opinions on the value of Natural Selection which recall the alternations of faith and scepticism which are so familiar in the lives of many great religious leaders. In Darwin's case, faith in Natural Selection finally triumphed, but it triumphed against great odds.

"I remember well the time," Darwin wrote, "when the thought of the eye made me feel cold all over, but I have got over this stage of the complaint, and now some small trifling particulars of structure often make me feel very uncomfortable. The sight of a feather in a peacock's tail, whenever I gaze at it, makes me sick."

But Darwinism survived the peacock's tail, just as it had survived the human eye, and in spite of an occasional infection of Lamarckian heresy, Darwin retained his robust faith in the all-sufficiency of Natural Selection.

It is important to remember that Darwin believed that transformation of species was affected by accumulation, under the influence of Natural Selection, of very *small* spontaneous variations. He had carefully considered the possibility that evolution might take place by means of small jumps. Indeed, the word "mutation" which De Vries popularised was actually used by Darwin in a letter which he wrote as early as 1845. None the less, Darwin remained convinced that, in his own words, "It is by the accumulation of extremely slight variations that new species arise."

Huxley, it is worth noting, never shared this view. "Mr. Darwin's position," he wrote in 1860, "might, we think, have been much stronger than it is if he had not embarrassed himself with the aphorism '*natura non facit saltum*'; we believe that Nature does make jumps now and then."

Huxley, though an enthusiastic champion of Darwin and evolution, was never more than a half-believer in Darwinism. "Our acceptance of the Darwinian hypothesis," he wrote, "must remain provisional so long as one link in the chain of evidence is wanting; and so long as all the animals and plants certainly produced by selective breeding from a common stock are fertile with one another, the link will be wanting."

This link in the chain of argument, like other links, has not been discovered, and Huxley, in consequence, never accepted wholeheartedly the true Darwinian gospel. In 1880 he contrived to deliver an address in celebration of the coming of age of the *Origin of Species* without once mentioning Natural Selection which, as Father Gerard remarks, "is to that work as the Prince of Denmark is to Hamlet."

To sum up, Darwinism is the theory that evolution can be explained without invoking a mind behind creation. The transformation of species is effected by the mechanical action of environment blindly selecting for survival fortuitous advantageous variations. Paley, in his

classic *Natural Theology*, had argued that it would be no more difficult to believe that a watch represented a mere chance aggregation of matter than that the human eye, so exquisitely adapted to the purpose which it serves, is not the creation of an intelligent being. The popularity of Darwinism was due very largely to the fact that Darwin was said to have refuted Paley. "The old argument from design in Nature," wrote Darwin, "as given by Paley, which formerly seemed to me so conclusive, fails, now that the law of Natural Selection has been discovered. We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by man. There seems to be no more design in the variability of organic beings, and in the action of Natural Selection, than in the course which the wind blows."

CHAPTER VIII

THE FAILURE OF DARWINISM

"To us Darwin no more speaks with philosophic authority."
(PROFESSOR BATESON, Presidential Address to the British Association,
1914.)

"We have now the remarkable spectacle that just when many scientific men are all agreed that there is no part of the Darwinian system that is of any great influence, and that, as a whole, the theory is not only unproved, but impossible, the ignorant, half-educated masses have acquired the idea that it is to be accepted as a fundamental fact. . . ." (DWIGHT, Professor of Anatomy at Harvard University.)

"It is pretty clear that we must wholly abandon the Darwinian hypothesis." (CUENOT, *La Genèse des Espèces Animales*, 1921, Second Edition.)

"For men of clear intellect Darwinism has long been dead." (DRIESCH.)

"Darwinism is a fiction, a poetical accumulation of probabilities without proof, and of attractive explanations without demonstrations." (*Dictionnaire Encyclopédique des Sciences*.)

ICAN only hope, in this chapter, briefly to summarise the main lines of attack on Darwinism by which—as explained in the last chapter—I mean the theory that the transformation of species was brought about by the mechanical accumulation of small, fortuitous variations during the course of countless generations.

(1) Natural Selection, to adapt Darwin's metaphor, is as powerless without favourable variations as the builder would be without bricks.

Darwin, however, made no attempt to account for the origin of those favourable variations, the transmittance of which is alleged to be due to Natural Selection.

This point was admirably put by Professor Hans Driesch, one of the greatest of German biologists, in the course of his famous Gifford Lectures delivered before the University of Aberdeen in 1907:

"It must be certain from the very beginning of analysis that natural selection, as defined here, can only eliminate what cannot survive, what cannot stand the environment in the broadest sense, but that natural selection never is able to create diversities. It always acts negatively only, never positively. And therefore it can 'explain'—if you will allow me to make use of this ambiguous word—it can explain only why certain types of organic specification, imaginable *a priori*, do *not* actually exist, but it never explains at all the existence of the specifications of animal and vegetable forms that are actually found. In speaking of an 'explanation' of the origin of the living specific forms by natural selection, one therefore confuses the sufficient reason for the non-existence of what there is not, with the sufficient reason for the existence of what there is. To say that a man has explained some organic character by natural selection is, in the words of Nägeli, the same as if someone who is asked the question, 'Why is this tree covered with those leaves?' were to answer, 'Because the gardener did not cut them away.' Of course, that would explain why there are no more leaves than those actually there, but it would never account for the existence and nature of the existing leaves as such. Or do we understand in the least why there are white bears in the Polar regions if we are told that bears of other colours could not survive?"

It is perfectly true that Darwinism attempts to explain the selection and not the production of variations. It is none the less true that the title of his book was ill-chosen, for, as Butler said, the true origin of species is the origin of variation, and a man who refuses to explain variation should not imply that he has explained species.

"In other words, Natural Selection," as Mr. Arthur

Harris remarks, "may explain the survival of the fittest, but cannot explain the arrival of the fittest."

Delage retorts that no theory is expected to solve any problems other than those which it raises. "Darwin considers the variations after their appearance and believes them to be accidental. It is only there that his explanation begins and it is only within the limits he assigned himself that we may criticise him."

(2) Favourable variations would tend to be extinguished by inter-breeding if, as Darwin believed, the accumulation of such variations depends on pure chance alone. Assume, for instance, that one individual in ten of a particular species possesses a favourable variation. It is clear that such an individual with such a worth-while variation has a choice, on the average, of nine females who are not so endowed, and one female who also possesses a similar worth-while variation. Clearly, of ten males possessing a worth-while variation, nine will, on the average, mate with females who have no such advantage, and only one will pass on to the next generation his own and his mate's advantages.

The mathematical theory of chances is fatal to the accumulation by inheritance of favourable variations by pure chance.

(3) Natural Selection, according to Darwin, worked by means of the *slow*, gradual accumulation of *small* variations.

Now Natural Selection is presumably still at work, excepting among domesticated animals and domesticated plants, and if Darwinism is true we should expect to find that the world was full of transitional forms, but the world is full of fixed types, and the five thousand years of recorded history are eloquent in their witness, not to transitional forms fading into each other, but to the stability of type.

Darwin was alive to this difficulty. "Why, if species have descended from other species by fine gradations," he asked, "do we not everywhere see innumerable tran-

sitional forms? Why is not all Nature in confusion, instead of the species being, as we see them, well-defined?"

His explanation is that by competition the less-improved parent form and other less-favoured forms will be crowded out by the new forms. We should like a little evidence for this process.

Darwin adds that nearly every species either preys on or serves as prey for other species. "In short, that each organic being is either directly or indirectly related in the most important manner to other organic beings,—we see that the range of the inhabitants of any country by no means exclusively depends on insensibly changing physical conditions, but in a large part on the presence of other species, on which it lives, or by which it is destroyed, or with which it comes into competition ; and as these species are already defined objects, not blending one into another by insensible gradations, the range of any one species, depending as it does on the range of others, will tend to be sharply defined."

"Here we have a *petitio principii*," remarks Professor Kellogg. "The sharp definition of species, that we started out to account for, is explained by the sharp definition of other species!"¹

Quite apart from the *petitio principii*, it is difficult to believe that Darwin himself was satisfied with the feeble fashion with which he had met one of the most unanswerable of all objections to Darwinism.

(4) Natural Selection fails to explain the first origin and perpetuation of those slight variations which in their rudimentary stage are not advantageous. "How could any rudiment of an organism," asks Driesch, "which is not functioning at all, not only be useful to its bearer, but be useful in such a degree as to decide about life and death?"

It is, for instance, very difficult to explain not only the final but the first intermediate forms between the ape-like ancestor and man himself, if we assume that to be the origin of man.

¹ *Darwinism To-day*. (Bell & Son.)

"Not very strong of arm, not very swift of foot, without a well-developed hairy hide, or large teeth or strong claws, man seems as a mere animal an exceedingly unfortunate one, good neither for attack nor defence, in short, very unfit for the struggle for existence, in that imaginary period of half-fledgedness between brute and man. . . . Let us try to imagine him rising in the scale according to the dogmas of evolution. Let us watch the arboreal monkey, well-fitted for his surroundings, gradually losing all that fits him for them. We see his coat growing thinner, his arms shorter, so that he loses his 'reach,' his legs longer so that climbing becomes harder, and at the same time his brain growing in some incomprehensible way, and for no good reason, excepting that it is necessary for the theory to believe that the brain development went on so swimmingly that it compensated for the physical degeneration."¹

(5) It is impossible to explain the last touches of protective mimicry by Natural Selection. Wallace quotes the imitative qualities of the leaf butterfly as follows:

"We come to a still more extraordinary part of the imitation, for we find representation of leaves in every stage of decay, variously blotched, and mildewed, and pierced with holes, and in many cases irregularly covered with powdery black dots, gathered into patches and spots, so closely resembling the various kinds of minute fungi that grow on dead leaves, that it is impossible to avoid thinking at first sight that the butterflies themselves have been attacked by real fungi."

In the incipient stages of protective colouring or mimicry no deceptive resemblance can be noticeable, and such modification can therefore render no real service to the animal or insect. As Delage has pointed out, "it would little avail an animal living in the Polar regions to present

¹ Professor Dwight, *Thoughts of Catholic Anatomist.*

a little white spot or a hide a trifle lighter in shade. In order to escape detection easily, the animal should be completely white."

(6) Natural Selection fails to explain the evolution of very complex organs such as the eye, which consists of several parts, parts which cannot function unless they are very accurately fitted into each other.

"One might possibly imagine," writes Wolff, "the adaptation between one muscle cell and one nerve end through selection among innumerable variations, but that such should take place in a thousand cases in one organism is inconceivable."

There is indeed, as Delage points out, not the least reason to suppose that "an accidental and insignificant variation is always accompanied by other variations which lend it usefulness; and therefore an isolated variation could become not only useless but even harmful.

"If to the mighty antlers of a stag there did not correspond a special development of the skull and of the muscles of the head and neck, those antlers would only prove an impediment to the animal."

(7) Darwin believed that evolution was the result of the struggle for existence, and that the transformation of species would be most marked where that struggle was most severe. The statistics, so far at least as human beings are concerned, appear to contradict this view. It appears that the years of rigorous selection, which produce a high death-rate among infants owing to inclement weather or epidemics, do not result, as they should according to the Darwinian hypothesis, in the production of a sturdier generation representing the survival of the fittest, but result, on the contrary, in a weaker generation, which is shown by the death-rate, which is usually higher in the years following an epidemic or a rigorous winter than in the years preceding them.

Again, Luther Burbank, the well-known horticulturist, states that in his experience it is invariably a rich soil and favourable conditions which determine the appearance of

new variations, whereas under-fertilised induces reversion.

The more favourable the conditions are the better protection the species will receive, and the more easily will it evolve.

Korschinsky, the Russian botanist, was a supporter of this view. He maintains that new forms appear and develop most easily, not as Darwin believed, where the struggle for existence is most severe, but where the struggle is least severe. "The origin of new forms can only occur under conditions favourable for them . . . the struggle for existence, and the selection which goes hand in hand with it, compose a factor which restricts new-appearing forms and restrains wider variations and which is in no way favourable to the production of new forms. It is indeed an inimical factor in evolution."

Delage concludes that the main rôle of selection is to suppress unsound variations, and to maintain the species in its normal character. "Far from being an instrument for the evolution of species it guarantees their fixity."

(8) Hugo De Vries, in his book *The Mutation Theory*, produced impressive evidence in support of his view that evolution takes place, not as Darwin believed by the slow, gradual accumulation of small variations, but by means of definite mutations or jumps.

(9) Natural Selection cannot explain the existence in the same organism of identical structures. "It cannot be explained by selection how the carnivores, for example, can have developed through fortuitous yet always similar variations, two such structures agreeing in all details as the back teeth, which have developed in course of time from small skin teeth. That a tooth can develop into such an admirable biting organ through chance variation may be explicable by selection, because we are accustomed to postulate thoroughly fortuitous and all-inclusive variation; but that the tooth standing next to it shall have varied always in exactly the same way so that the result of its development shall make it identical with the other one, is inex-

plicable by selection on a basis of fortuitous variation, but rather indicates that the change of form is ruled by law which we do not know. The attempt to discover it is the most imperative task for biologists to undertake."¹

(10) Many of the characters which distinguish one variety from another are of no particular utility, and therefore present no survival value, and consequently cannot owe their existence to Natural Selection. To this Darwin replied: "Shall poor blind man say what characteristic, however slight and insignificant, is or is not of advantage in the great complex of Nature?" An answer which disposes of the arguments for evolution based on useless and vestigial organs. For who is "poor blind man" to say that any organ is useless in the great complex of Nature?

Of course, the agnostic who rejects evolution as unproved, is fully entitled to exploit the "poor blind man" argument, but the dogmatic evolutionist, who claims to have solved the riddle, is not entitled to explain away the inconsistencies of his solution on the ground that the scientist is a "poor blind man." Perhaps he is, but if so he must not expect us to accept his solution.

(11) Natural Selection postulates that slight favourable variations are the main factor in the survival of any particular individual. But in fact survival is determined far less by some slight advantageous superiority than by the pure luck of position. "What shall decide," writes Kellogg, "when the big whale opens his mouth in the midst of a shoal of myriads of tiny Copepods floating in the pelagic waters of the Aleutian seas, what Copepods shall disappear for ever? Mainly, we may say, the chance of position. A bit more or less of size, or strength, or redness, or yellowness, or irritability or what not of form and function is going to avail little when the water rushes into the yawning throat. . . . Kelsey Creek runs into Clear Lake, in Northern California; it is usually ever-living, but some summers it suddenly dries up. Fish play back and forth between this stream and the lake; at the time of the sudden

¹ Wolf, quoted by Vernon L. Kellogg.

drying a few hundreds of thousands out of many hundreds of thousands that habitually live in the stream and adjacent lake waters find themselves one awful day gasping painfully for water to wet their drying gills. They gasp a short while and then die. Did they all have the same number of scales, the same shape and size of body, the same tinges of fleeting colour? No, they represented most of the possible gamut of Darwinian variation for their particular species. But they were dealt all together, by the ill-chance of position."¹

And that will do. There are many other arguments against Darwinism, but those I have mentioned should suffice. It is, indeed, difficult to understand why biologists continued either to defend or to refute the theory of Natural Selection once they had Darwin's ineffective reply to the strongest of all arguments (No. 3) against the transformation of species by slow minute changes, an argument based on the absence of transitional forms, not only from the geological record, but from the world around us.

I do not think it is necessary to discuss in detail Darwin's auxiliary theory of sexual selection, a theory which is even more discredited than that of Natural Selection. The reader who is interested will find a discussion on sexual selection in Professor Kellogg's book *Darwinism To-day*.

The reader will, perhaps, notice that the arguments which have been summarised in this chapter are such as might well have occurred, as some of them did indeed occur, to men of no scientific training and no biological knowledge. The case against Darwinism, in brief, does not rest only on the testimony of experts, but on rational inferences from obvious premises.²

¹ *Darwinism To-day*, by Vernon L. Kellogg, page 81-2.

² An excellent summary of the case against Darwinism will be found in Mr. Hilaire Belloc's *Companion to Mr. Wells's Outline of History*.

CHAPTER IX

THEOPHOBIA

THE real problem of Darwinism is to explain the facile triumph of a theory which, as we have seen in the last chapter, is open to such obvious and to such unanswerable criticisms, criticisms which are based, not on the appeal to esoteric scientific knowledge, but on common sense.

Darwinism, as we have seen, was not intrinsically plausible. We should, therefore, naturally expect that a theory which did such violence to common sense would be accepted, if accepted at all, only after a long and desperate struggle for recognition. But there was no such struggle. "Why did the Victorians," as Mr. Bernard Shaw put it, "jump at Darwinism?" That is the problem which we have to solve.

I think the solution must be sought in that definite bias against theism which was common in Victorian scientific circles.

Paley's famous argument from the design to the designer appeared unanswerable until Darwin offered a way of escape by suggesting that the appearance of design was deceptive, and that this seeming design was the result of blind chance alone.

Huxley, for instance, began by disbelieving in evolution. He met Darwin some years before the *Origin of Species* was published and expressed his belief "in the sharpness of the lines of demarcation between natural groups and in the absence of transitional forms with all the confidence of youth and imperfect knowledge."

Why "imperfect knowledge"? Did the lines of

demarcation seem less sharp as his knowledge advanced? (I doubt it.)

By 1857 Huxley, we are told, "was feeling that some working hypothesis must be found respecting the origin of known organic forms to replace the untenable separate creation theory." And this explains the enthusiasm with which Huxley flung himself into the fray on Darwin's behalf. Huxley, as we have seen, never fully accepted Darwinism. None the less he clung to Darwinism, not because he believed in it, but because it provided "a working hypothesis," or, to put it more accurately, an excuse to reject the untenable hypothesis of a separate creation.

Why "untenable"? No philosophic argument can be put forward against the possibility of a separate creation.

By 1857 the Victorian scientists were seeking for some alternative not only to the "separate creation theory," but also to a theory which they regarded with equal distaste, the theory of a separate Creator Himself. Huxley and his school did not sit down patiently before the facts, and reluctantly arrive at an atheistic conclusion. Their belief in a mechanistic universe was based, not only on bad philosophy, but was the outcome of a definite, if unavowed act of volition; the will to disbelieve in the theistic, the will to accept the atheistic hypothesis.

Natural Selection is, of course, not inconsistent with theism, for the Creator might, had He chosen, have worked through the agency of pure chance undisturbed by design. But Natural Selection, though not inconsistent with theism, deprives the theist of one of his most valuable weapons, the argument from design. Darwinism would not have survived as long as it did, had it not been for the pathetic loyalty of the Victorian materialist to a creed which provided him with a plausible alternative to the belief in design with its horrid consequence, the belief in God.

"We must assume," wrote Weismann, "Natural Selection to be the principle of the explanation of the metamorphoses because all other apparent principles of explanation

fail us, and it is inconceivable that there should be another capable of explaining the adaption of organisms *without assuming the help of a principle of design.*"

The italics, which are Weismann's, emphasise the horror with which he contemplated the appalling alternative.

We must accept, so he argues, a theory which we have every reason to distrust because the only alternative implies the existence of God.

We must assume. And yet it was the Victorians who contrasted the theologian who assumes, with the scientist who proves.

Another example, this time from Delage, the Professor of Comparative Zoology at the University of Paris.

Professor Delage was reluctantly compelled to reject Darwin's theory of Natural Selection as the explanation of evolution, but he hastens to add: "Whatever may befall this theory in the future, whether it is to be superseded by some other theory or not, Darwin's everlasting title to glory will be that he explained the seemingly marvellous adaptation of living things by the mere action of natural factors without looking to a divine intervention, without resorting to any finalist or metaphysical hypothesis."

What does this mean? "Darwin's everlasting title to glory" is the fact that he was wrong? There is nothing particularly glorious in having provided the fool "who says in his heart 'There is no God'" with a plausible excuse for his folly.

If we eliminate the Creator we must assume that life generates spontaneously from lifeless matter. Spontaneous generation is *de fide* for the atheists. Unfortunately, all attempts to prove the possibility of spontaneous generation have failed completely. "Spontaneous generation," wrote Weismann, "in spite of all vain efforts to demonstrate it, remains for me a logical necessity."

Weismann's conception of "logical necessity" would not be endorsed by a logician.

Logic does not compel us to accept a conclusion against

all the weight of evidence, merely because we entertain a sentimental affection for a premise, such as Weismann's premise "there is no God," whose truth we have assumed without adequate proof. On the contrary, the laws of reasoning compel us to reconsider any premise which leads to a conclusion about which adequate proof is lacking.

The real problem is to explain the reluctance of Weismann and others to accept the theistic hypothesis, for it is difficult to understand why anybody should reject with joy a belief which holds out some hope of survival to the individual and which reads some significance into the cosmic process. Nor is it easy to understand the fascination of that mechanistic interpretation of the life which reduces the universe to an aimless interplay of atoms unredeemed from futility by the least hint of final purpose.

I have described the mechanistic interpretation of the universe as the Victorian heresy. The heresy in question has its roots in the past, but it reached its most rigorous development in the late Victorian era, and passed its zenith before the Victorian age came to an end.

This heresy was the result of a suppressed phobia, of a complex in the proper sense of that much-abused term. The *Concise Oxford Dictionary* defines "complex" as "a mental abnormality set up by a body of suppressed tendencies."

I do not suggest that the atheist, as such, is mentally abnormal, but I do maintain that the mentality of those who reject theism with relief is abnormal. It is not the disbelief, but the will to disbelieve that calls for a diagnosis. Theophobia, to borrow Father Wasman's useful term, is an excellent example of "a mental abnormality set up by a body of suppressed tendencies."

Perhaps by analysing these suppressed tendencies we shall find the clue for which we are seeking.

Theophobia is a very usual complaint among the products of a Calvinistic upbringing.

"If you can realise," writes Mr. Shaw, himself a product

and a reaction from Irish Protestantism which has many affinities with Calvinism, "how insufferably the world was oppressed by the notion that everything that happened was an arbitrary personal act of an arbitrary personal God of dangerous, jealous and cruel personal character, so that even the relief of the pains of maternity by means of chloroform was objected to as interference with His arrangements which He would probably resent, you will understand how the world jumped at Darwin."

Perhaps, but the jump was by no means a "logical necessity."

It is irrational to jump at atheism merely because one rejects with relief a particularly unpleasant and a particularly stupid interpretation of theism.

Similarly, the high-spirited rebel against Victorian society was swayed by emotion rather than by logic in his identification of God with the smug respectability of the possessing classes. In England, it is true, nonconformity has provided the Radical with a safety-valve, and has thus enabled him to dissociate God from the Conservative Party, a mental effort of which, apparently, the Continental Radical is temperamentally incapable. Abroad, socialism and atheism tend to be identified, mainly because the Roman Catholic Church has never flirted with socialism, and has had the courage to denounce communism as a dangerous heresy.

In Russia atheism is the established religion of the country.

"The term *Bog*, God," writes Bukharin, "comes from the same root as the word *Bogaty*, rich. God is therefore strong, powerful and rich. What other names has God? He is called the Lord, that signifies Lord in contrast to slave; God is also called the Ruler in Heaven, and all the other titles of God, such as Governor and the like, point in the same direction. . . . Faith in God is thus a reflection of loathsome earthly conditions; it is faith in a slavery which exists, presumably, not only on earth but throughout the Universe."

This eloquent outburst does more credit to Bukharin's heart than to his head, but it would, perhaps, be foolish to expect logical reasoning from a Russian communist.

The anti-religious bias of so many scientists is partly due, as Sir Arthur Eddington has pointed out, to a "tidiness of mind which rebels against the idea of permeating scientific research with religious implication."

It is obviously the duty of a scientist to be very chary of invoking the First Cause as an explanation. It is the business of science to explain natural phenomena by natural causes. There are few intellectual pleasures more wholly satisfying than those associated with the discovery of the clue to some complicated natural process, such as evolution. Darwinism appealed to the scientific world because Darwinism appeared to be a key which opened many doors and was a single explanation for the manifold variety of living forms. It is perhaps conceivable that the various species were created separately by God, but a premature acceptance of this solution is to be deprecated. It is too easy, too like looking out the results of a sum at the end of the book before you have tried to work out the sum in question.

The anti-religious bias of the Victorian scientists was, however, due not only to such motives, motives which command respect, but also to the dictates of fashion which are as potent in the scientific world as in the world of society.

Christianity was definitely unfashionable in the world of Victorian science. Huxley and Grant Allen would have sympathised with the matter though they might have deprecated the manner of a certain famous confession from the pen of Mr. Arnold Bennett:

"In my opinion (1909) it is absolutely impossible for a young man with a first-class intellectual apparatus to accept any form of dogma, and I am therefore forced to the conclusion that Mr. Chesterton has not got a first-class apparatus. (With an older man whose central ideas were definitely formed at an earlier epoch, the case might be

different.) I will go further and say that it is impossible, in one's private thoughts, to think of the accepter of dogma as an intellectual equal."

Mr. Bennett's candour is disarming. In so far as his mind is a closed book to any evidence for the supernatural he is, of course, the victim of an inhibition which afflicts not only those who, like Mr. Bennett, are in revolt against the religious environment of their youth, but also those who have been brought up in an atmosphere of serious-minded and high-principled rationalism.

Professor Julian Huxley, for instance, would find it as difficult to consider with an open mind the case for Christianity as his grandfather found it difficult to consider the case for Spiritualism.

And yet it is impossible to read Julian Huxley's book, *Religion without Revelation*, without realising the desperate shifts to which Julian Huxley has been put to maintain his old-fashioned disbelief.

Professor J. B. S. Haldane has recently affirmed his conviction that "the meaning of the visible world is to be found in the invisible." "If I thought," he adds, "that the aims of science and art were merely material I should belong to some church. But I believe that the scientist is trying to express absolute truth and the artist absolute beauty."

What exactly does Professor Haldane mean by "the invisible world"? What does he mean by "absolute truth"? Surely it is unscientific to interlard one's criticisms of creeds, which at least made their meaning clear, by cryptical phrases to the significance of which Professor Haldane provides no clue.

Aquinas would never have made use of an expression like "absolute truth" until he had carefully defined what he meant by "absolute," and until he had thought out the conclusions which followed from the belief in "absolute truth." Aquinas is a lucid writer precisely because he treated words and phrases with respect, and knew that exact definition must precede intelligent discussion.

The theist, of course, knows exactly what he means by absolute truth and absolute beauty, and knows exactly why he believes in an invisible world, but it is difficult to see in what intelligible sense these terms could be used by those who reject theism.

But perhaps Professor Haldane does not reject theism. Perhaps he merely shrinks from thinking out the theistic implications of the expression which he uses. It must be tiresome to be stopped from using a useful three-lettered monosyllable "God" by these lingering Victorian prejudices.

The intelligentsia would, I believe, be less biased against religion if religion was not so closely identified with morality. The atmosphere of the tract broods over religious debate. And this is a pity, for religion is not only a way of life, it is also an attempt to solve a scientific problem.

Religion, properly regarded, is a branch of scientific research, an important branch which is concerned, not merely with the significance of fossils, but with the significance of the universe as a whole. It is irrational to be deterred from this particular form of scientific research merely because religion is often represented as if it was nothing more than a prophylactic against vice. Many people who are intelligent enough to appreciate the strength of the case for theism are deterred from describing themselves as theists because they are in unconscious revolt against the identification of religion with the atmosphere which we associate with a confirmation address. It is, however, conceivable that a man may accept the theistic solution, not because he is in a state of morbid anxiety about the salvation of his soul, but because he has a strong prejudice in favour of drawing rational inferences from the available evidence. Theism is a criterion, not of morality but of intelligence. The devils also believe and tremble, and in so far as they believe they are, at least, intelligent devils.

An anti-religious bias is often the result of that loose

thinking which associates smugness with Christianity. Smugness so far from being a characteristic Christian vice, happens to be one of the failings against which Christians are more on their guard than other people, for the good reason that their Founder singled out this sin for special condemnation. The Churches to-day would earn far more general respect if they were a little more self-satisfied and a little less diffident. It is the rarest thing to-day in the world to meet a really smug Christian. Most modern Christians are too much on the defensive, too deferential to scientists, too eager to adjust their faith and their standards to the changing dictates of modern thought.

Meanwhile, the smugness which characterised a certain type of early Victorian religion has been taken over by the Victorian rationalists. The great Victorian rationalists retained the pulpit manner while attacking the pulpit message. Huxley characteristically calls his addresses "Lay Sermons." Ethical societies were founded to provide atheists with a surplice and a pulpit. The Christian had proclaimed the duty of belief. The Victorian atheist sanctimoniously preached the duties of unbelief. "It is always wrong everywhere and for everyone to believe anything upon insufficient evidence," cried Professor Clifford. "An assertion which outstrips the evidence is not only a blunder, but a crime" echoed Huxley.

There is a tone of pedantic rectitude about this sort of thing which, to me at least, is vastly more irritating than the franker piety of the tracts. A tract is, at least, redeemed from pharisaism by a strong appeal to self-interest. "Be virtuous and you will have your reward in the next world." But the ethical moralist is never tired of assuring the world that he requires no such inducements to virtue. He is not as other men or even as this Christian. "We do not require to be bribed into virtue by hopes of Heaven, or deterred from vice by fear of Hell. Such motives are in the highest degree unethical." This is no caricature. I am quoting verbatim from a sermon which I heard on my first and last visit to the Ethical Church.

The anti-religious bias of scientists is often due to a prejudice against the emotional atmosphere of religion which is contrasted unfavourably with the impersonal atmosphere of scientific research. But it is illogical to deduce that the Theist is necessarily swayed by sentimental appeals, or that a hard-headed realist is necessarily right. I sometimes wonder whether the phagocytes that inhabit my body include hard-headed scientific phagocytes who reject with scorn the contention that the vast Luniverse is controlled by mind, and who attribute such sentimental beliefs to mere phagocytomorphism.

In conclusion, I must repeat that in this chapter I am trying to diagnose not the mentality of atheists, but the mentality of those who welcome the atheistic solution. I find it particularly difficult to understand and to reconcile this attitude with the existence of a strongly developed æsthetic sense. I, for one, am less interested in the association of religion and morality than in the indissoluble link between religion and beauty. Whether any moral code would survive in a world converted to materialism is a question on which opinions differ, but beauty certainly withers at the touch of materialism. Naturalism, as I hope to show, provides no criterion for preferring truth to falsehood, no rational basis for discriminating between beauty and ugliness.

How can we discriminate, on the materialistic hypothesis, between the genius and the idiot, between the masterpiece and the daub? Both are alike the inevitable and therefore the only right result of the movement of atoms of which the original nebula was composed. Truth and beauty have no relevance in the materialistic universe, a universe in which there can be no hierarchy of values, a universe in which a Bellini takes no precedence of a cigarette card.

Huxley believed that physical science would probably enable our posterity to set forth the "exact physical concomitant and conditions of the strange rapture of beauty." "But if ever that day arrives," he added, "the rapture will remain." I doubt it, for our response to beauty is our

unconscious tribute to the supernatural of which beauty is the sacramental expression.

Materialism was a by-product of Puritanism, and I agree with Julian Huxley that his grandfather was "by temperament a Puritan." Only a Puritan could have written, as Thomas Huxley wrote, "Since the time of Constantine there has been nothing but tawdry rubbish in the shape of architecture . . . the hopeless bad taste of the Papists is a source of continual gratification to me."¹

Huxley was easily pleased. A man who could be gratified by the hopeless bad taste of Chartres, St. Mark's, Venice, and St. Clemente, Rome, and suchlike tawdry rubbish would, perhaps, find it easy to believe in a mathematical formula to explain his reaction to beauty.

The convinced materialist is divorced from European tradition and from European culture. It may not be essential to believe, but it is at least essential once to have believed in the literal accuracy of the Old Testament fully to enjoy the glorious mosaics in the narthex of St. Mark's, mosaics which interpret so faithfully the Bible of the child. Those to whom we owe those mosaics were inspired children and their outlook will only be intelligible to those for whom, at some period of their lives, Noah was as real as their own fathers.

The materialist may find a formula for differentiating between the architecture in one cathedral and another, but the real message of the cathedral will escape him unless he is sensitive to the spiritual difference between Chartres and the Taj Mahal.

To a materialist a cathedral is a monument to human folly, the tomb of human hopes, the building in which foolish medicine-men have performed their foolish rites. One need not be a Catholic, one need not even be a Christian, one need only be a half-believer to feel that there is something more in St. Mark's than the stones of which

¹ *Life and Letters*, Vol. II, page 88.

it is built, for the past is still potent and not so dead as the materialists would have us believe.

"Thou has left behind
Powers that will work for Thee; air, earth and skies
. . . Thou hast great allies.
Thy friends are exultations, agonies
And love, and man's unconquerable mind."

Whether the hopes and fears and joys of past generations can penetrate these great shrines I do not know, but there are moments when I half believe in their persistence, and even half-beliefs are better than none.

Men who have been brought up in the arid atmosphere of rationalism suffer from stunted imaginations. Think, for instance, of John Stuart Mill, whose mind was composed of hard angles and outlines. There was no "twilight in his soul."

And that is my chief complaint against materialism, not that it is immoral, but that it is dull, stupid and ugly. One cannot, of course, cherish picturesque beliefs just because they are picturesque. On the Greek hills I have sometimes wished that I could still believe in the fauns and dryads which once haunted them, but the faun has vanished for ever from our world.

"From haunted hill and dale
Fringed with poplar pale
The parting genius is with sighing sent."

"With sighing"—that is the point. I can sympathise with those who get rid of God with a sigh, but I cannot understand the rationalism which pretends to find cause for rejoicing in the twilight of the gods, and in the loss of beliefs, which we know to be true and which they know to be beautiful.

CHAPTER X

BIAS

A TRAINED scientist should be as expert in sifting evidence as a judge, but in one respect, at least, the Victorian scientist compares unfavourably with judges.

Judges are guided by certain rational principles in estimating the effect of human bias, but the Victorian scientist proceeded on the unwarrantable assumption that he was entitled to disregard the arguments of any scientist who could be proved to have a bias in favour of theism.

It was assumed that you could dispose of the arguments of an anti-Darwinian by the simple expedient of proving that he had a Christian bias. It would, of course, be equally rational to assume that the arguments of a Darwinian could be refuted by proving that he had an atheistic bias. Professor Kellogg, in a book from which I have already quoted, refers to certain Roman Catholic priests "with a considerable natural interest in natural history, and a strong professional interest in anti-Darwinism." But is there no such thing as a strong professional interest in pro-Darwinism? Would not the chances of a candidate for a scientific fellowship in 1880 have been adversely affected had he been known to hold anti-Darwinian views or, worse still, to be a disbeliever in evolution?

It is curious that the scientists should have made no attempt to formulate a definite law for estimating the effect of personal bias, a law urgently required by those whose conclusions are based on evidence and on arguments, many of which are affected by the personal equation.

I suggest that the law of bias might be formulated in some such terms as these:

"Bias must be allowed for in estimating the value of evidence, but not in estimating the validity of arguments."

A few illustrations will, I hope, convince the reader that this law is sound.

In estimating the value of the evidence for a ghost story we must allow for the bias of a witness known to be a convinced Spiritualist, for a Spiritualist starts his investigations with a bias in favour of ghosts, and is, therefore, more likely than an atheist to mistake some natural for a supernatural phenomena.

Similarly, we must allow for bias in estimating the evidence of the conjurer Houdini who claimed to have exposed the medium "Margery," for Houdini, like many other conjurers, had a strong professional interest in exposing mediums.

On the other hand, it is childish to meet an *argument* by an accusation of bias. The question of bias arises only in connection with the evidence for the facts on which the argument is based, and it can therefore only concern the witnesses who have been cited in support of those facts. You may logically refute an argument by alleging bias against a witness, but you do not strengthen your case by alleging bias against the arguer himself unless he has gone into the witness-box.

If an atheist is arguing with a Christian on the subject of miracles, he is entitled to argue that the apostles were biased in favour of the supernatural, but he is not entitled to continue, "And you, of course, are biased in favour of Christianity." It is obvious that both atheist and Christian who take part in the discussion are biased in favour of their own particular views.

My only defence for inflicting these truisms upon the reader is the fact that they have yet to be recognised as such by orthodox science.

Professor Hartog, for instance, tells us that Darwin's most formidable critic, that distinguished scientist,

Professor Mivart, "was regarded as negligible since he evidently held a brief for a party standing outside the scientific world." It would be as rational to regard Huxley as negligible because he evidently held a brief for a party standing outside the theological world, or indeed, to regard the arguments of any barrister as negligible because he was clearly biased in favour of his client. All barristers are "biased," but a sound argument is no less sound because advanced by a barrister with a bias in favour of his client.

The Darwinians would, indeed, have been more effective controversialists had they been trained in a court of law to distinguish between relevant and irrelevant considerations.

On one occasion the Counsel for a murderer staggered the Court by assuring the jury that he was personally convinced of the innocence of his client. The judge administered a devastating rebuke. "We are not interested in your personal views. Your duty is to state the case for your client. Your arguments will be no weaker even if you believe your client to be guilty, and no stronger even if you believe him to be innocent."¹

Again, if the effect of the personal equation were more generally understood, we should be spared those acrimonious criticisms of arguments advanced by amateurs against the conclusions of specialists.

The Victorian scientist not only considered that he had refuted Mivart by showing that Mivart was biased in favour of Christianity, but he was equally convinced that he had refuted Samuel Butler, a no less formidable critic of Darwinism, by proving that Butler was an amateur with no scientific training. The law of bias may be adapted to this case. *The credentials of a writer must be examined in estimating the value of his evidence, but not in estimating the validity of his arguments.*

The evidence of an amateur experimentalist on some problem of research would not weigh heavily against the

¹ I quote from memory, but I believe this incident occurred in connection with the trial of the poisoner Palmer.

view of an expert researcher, but if expert and amateur are arguing on the basis of facts admitted by the expert, it is ridiculous for the expert to challenge the credentials of the amateur.

The specialist who has convicted an amateur of elementary blunders is entitled to attribute his errors to lack of technical training, but he is not entitled to say, "I am right because I am recognised as a specialist, and you are wrong because you possess no academic qualifications whatever." This is much as if an eminent Counsel were to urge the jury to ignore the arguments of a young barrister on the ground that he had just been called to the Bar.

Similarly, if you convict a writer of bad logic or weak reasoning, you are entitled to hold a post-mortem and diagnose "bias," but the post-mortem must follow and must not precede the "mors." I have collected in this book many examples of bad logic which I attribute to an anti-religious bias clouding the reasoning powers of men for whose intellect I have a profound respect, but unless I could produce objective evidence in support of this charge, I should not feel entitled to mention the personal factor. In other words, I have introduced the question of bias to explain the weakness of an argument, the unsoundness of which has previously been demonstrated. Once a man has been fairly convicted of unreason, it is often profitable to seek for the explanation of his sin against sound logic, but you must prove the crime before you begin to reconstruct it.

CHAPTER XI

AMATEUR VERSUS PROFESSIONAL

I

THE facile triumph of Darwinism was partly due to "Theophobia," partly to the deplorable strategy of ecclesiastical critics, and partly to the fact that Darwin's two most effective opponents, Mivart and Samuel Butler, were both discounted, the first because he was a Roman Catholic, and the second because he was a scientific amateur.

The Darwinians owed a great debt to men like the Bishop of Oxford and Gladstone whose ill-judged attacks helped to create the legend of a conflict between Science and Religion.

The opening phases of the campaign ended with the Darwinians in easy possession of the field. At the meeting of the British Association at Oxford, the Bishop of Oxford provided Huxley with a splendid opening.

He had delivered a foolish and flippant attack on evolution, and towards the end of his speech he had turned to Huxley, who was present, and "with smiling insolence begged to know whether it was through his grandfather or his grandmother that he claimed to be descended from a monkey."

Huxley turned to his neighbour and exclaimed, "The Lord hath delivered him into my hands." Huxley concluded his reply with these words: "If I am asked whether I should choose to be descended from the poor animal of low intelligence and stooping gait who grins and chatters as we pass, or from a man endowed with great ability and a splendid position who should use these gifts to discredit

humble seekers after truth, I hesitate what answer to make."

The substance of this retort—"I would rather be descended from an honest monkey than a dishonest Bishop"—is not perhaps very brilliant, judged by the standards of cold print, but it certainly achieved a debating triumph.

Gladstone was the next victim. He endeavoured with indifferent success to defend "the impregnable rock of Holy Scripture" in general, and the First Book of Genesis in particular against the onslaughts of the Victorian scientists. Huxley's reply was crudely effective, and consolidated his reputation as a brilliant and redoubtable controversialist, a reputation which might, perhaps, have been slightly impaired had not Huxley carefully avoided all controversy with an opponent vastly more formidable than Gladstone, an opponent whose name cannot be found in the index to *The Life and Letters of Thomas Henry Huxley*.

That opponent was Samuel Butler.

It is generally recognised to-day, even in scientific circles, that Butler's criticisms of Darwin were unusually brilliant. Professor J. A. Thomson described his book on Evolution as "a keen-witted criticism of orthodox Darwinism." There are many flattering references to Butler in the centenary volume of *Darwin and Modern Science*. Professor Bateson, for instance, described Samuel Butler as "the most brilliant, and by far the most interesting of Darwin's opponents."

Again, Butler's independent rediscovery of Hering's theory of memory proves that he possessed scientific talent of no mean order. None the less, Butler's criticisms were ignored, and Butler himself was completely boycotted by the scientific world. And not only by the scientific world. His later books were virtually ignored in that lay press which took its opinions in scientific matters from the recognised leaders of orthodox science.

Butler was boycotted for a variety of reasons. His brilliant qualities of irony and humour told against him in that serious age. He expressed the lowest opinion of the

members of the Royal Society, and went out of his way to irritate the very audiences to which his work should have appealed. Not content with attacking Darwinism, he attacked Charles Darwin himself, and finally, he was damned as an amateur, as a man who had no scientific research to his credit impudently trespassing on the preserves of the specialist.

The recognition which Butler has received since his death is a reflection on those scientists who ignored him during his lifetime.

If the theories which he advanced deserved attention, the manner in which he advanced them should not have deterred the true scientist from giving them careful examination. "Sit down before fact as a little child," wrote Huxley. Butler's books were packed with new and stimulating facts. The scientist should not concern himself with the dress in which facts are clothed. Truth is truth even when proclaimed by the most irritating of prophets.

II

Samuel Butler was born in 1835. His grandfather was Dr. Butler, the Headmaster of Shrewsbury School, and his father was the Reverend Thomas Butler, who is better known to the modern generation as the villain of that witty, but painful work, *The Way of all Flesh*. Cynicism is often sentimentalism turned sour, and Butler, like many other cynics, was temperamentally very sentimental.¹

It was Butler's misfortune to place his affections, not once but many times, on irresponsible recipients, such as his father in his boyhood, and the worthless young man, Pauli, in his middle period. Mr. Kingsmill, in his acute study of Butler,² has suggested that Butler went through life looking for somebody to fulfil the rôle of the ideal parent. He had read the *Origin of Species* when it first appeared, and had started a correspondence with Charles

¹ See his letters to Faesch. *Samuel Butler, a Memoir*, Vol. II, pages 203-4.

² *After Puritanism*, by Hugh Kingsmill. (Duckworth.)

Darwin, who replied courteously, as he always did to his unknown correspondents, and invited Butler to visit him at Down. Butler was prepared to lavish on Darwin the affection of which his father had proved so unsatisfactory an object in his early life. Unfortunately Darwin was too busy and too preoccupied to do justice to the part for which he had been cast. Butler's disappointment, of which he was perhaps only subconsciously aware, at Darwin's failure in the paternal rôle, which was even more pronounced than that of the Reverend Thomas, helps to explain the fact that Darwin was the villain of Butler's scientific books, just as his real father was the villain of his one and only novel.

Butler's dislike of his father affected his whole mental outlook. Like so many of those who have disliked or dreaded their fathers during childhood, he tended to identify God with his father, thus producing the complex of theophobia.

He was fascinated by Paley, and devoted an entire chapter to illustrations, quoted from Paley, of design in Nature. Once he began to quote, he found it difficult to stop. "It is positively painful," he writes, "to pass over Paley's description of the joints." He broke with Darwinism precisely because he was convinced by Paley's teleology. And yet, though he followed Paley step by step to the penultimate link in the great argument, he shrunk back in irrational horror from Paley's conclusions. He simply could not bring himself to admit the existence of a Deity whom he still regarded as an ally of the Reverend Thomas Butler.

"We turn, then, on Paley," he writes, "and say to him: 'We have admitted your design and your designer. Where is he? Show him to us. If you cannot show him to us as flesh and blood, show him as flesh and sap; show him as a living cell; show him as protoplasm. Lower than this we should not fairly go.' "

Poor stuff for so brilliant a thinker as Butler.

III

In 1877 Samuel Butler published his book, *Life and Habit*, perhaps the most brilliant book on a scientific subject which has ever been published by a layman in scientific matters.

The main argument of the book is an attempt to identify instinct and memory. In the opening chapter Butler proves that no action is really proficient until the action has become unconscious. The novice learning the piano *consciously* deciphers the musical score, but the expert reads the score subconsciously. The same holds good in reading and writing; the beginner studies the individual letters, the expert reads whole phrases subconsciously. We have no real knowledge of any subject "till we have left off feeling conscious of the possession of that knowledge, and of the grounds on which it rests.

"No thief, for example, is such an utter thief—so *good* a thief—as the kleptomaniac. Until he has become a kleptomaniac, and can steal a horse, as it were, by a reflex action, he is still but half a thief, with many unthievish notions still clinging to him. Yet the kleptomaniac is probably unaware that he can steal at all, much less that he can steal so well. He would be shocked if he were to know the truth. So again, no man is a great hypocrite until he has left off knowing that he is a hypocrite."

Instinct, according to Butler, is the unconscious memory of actions which we have performed on innumerable previous occasions. There is no real breach of continuity between a man, his parents and his ancestors, and Butler accordingly extends the scope of memory to the memory of actions which we have performed in the persons of our remote ancestors.

Butler points out that a baby of a day old "sucks (which involves the whole principle of the pump, and hence a profound practical knowledge of the laws of pneumatics and hydrostatics), digests, oxygenises its blood (millions of years before Sir Humphry Davy discovered oxygen),

sees and hears—all most difficult and complicated operations, involving a knowledge of the facts concerning optics and acoustics, compared with which the discoveries of Newton sink into utter insignificance."

It is incredible, Butler argues, that a baby of a day old should be able to perform all these complicated operations so perfectly without long practice and without previous experience. From this Butler deduces that the baby has indeed enjoyed both long practice and previous experience. The baby has been performing these actions for millions of years in the persons of its ancestors. Long practice has thus made perfect, conscious into subconscious knowledge.

Actions performed in this automatic manner did at one time call for conscious thought and were liable to failure. Butler proceeds to show "that we are most conscious of, and have most control over, such habits as speech and the upright position, acquisitions which are comparatively recent in the history of the human race. But we are less conscious of, and have less control over, eating and drinking and swallowing and breathing, seeing that these were acquisitions of our pre-human ancestry, and that we are most conscious over, and have least control of our digestion and circulation which are, geologically speaking, of extreme antiquity. We have repeated the action so frequently and on such innumerable occasions that the last stage of conscious knowledge has passed into that unconscious knowledge which is described as instinct.

Indeed, "in the case of the circulation of the blood the whole performance has become so utterly of rote, that the mere discovery that we could do it at all was considered one of the highest flights of human genius."

The text on which Butler continued to preach is all summed up in one sentence. "We all become introspective when we find that we do not know our business, and whenever we are introspective we may generally suspect that we are on the verge of unproficiency . . . the baby that becomes aware of its breathing does not know how to breathe 'and will suffer for his ignorance and incapacity'."

In other words, consciousness and volition have a tendency "to vanish as soon as practice has rendered any habit exceedingly familiar, so that the mere presence of an elaborate but unconscious performance shall carry with it a presumption of infinite practice."

When Butler was about to go to press with his book, his attention was drawn to the fact that Professor Ewald Hering, in his Inaugural Address to the Imperial Royal Academy of Science at Vienna, had anticipated Butler's classification of instinct and memory. Butler immediately secured this Address, and obtained Professor Hering's permission to translate it into English. The English translation appears in Butler's book, *Unconscious Memory*.

Hering's theories had attracted a certain amount of attention, notably from Haeckel and Ray Lancaster. Butler's book, though the theory which he put forward was identical in many respects with Hering's, was treated as a huge joke. Darwin himself simply ignored the book, and his attitude proved a great blow to Butler. "My pages," wrote Butler, "teemed with allusions to Natural Selection, and I sometimes allowed myself to hope that *Life and Habit* was going to be an adjunct to Darwinism which no one would welcome more gladly than Mr. Darwin himself."

He greatly deceived himself. In point of fact, *Life and Habit* represents the conflict between Reason and Sentiment. His reason had led him to reject the Darwinian conclusions, but his sentiment still clouded his judgment. He was still hoping that Darwin would fill with more success the rôle in which the Reverend Thomas Butler had proved such a signal failure.

A pathetic illusion, for Butler was deceiving himself. He had really no right to expect that Darwin would be pleased by a book which was far more definitely anti-Darwinian than its author cared to realise. It is doubtful if Butler would have obtained a hearing had he been an enthusiastic supporter of "Natural Selection." Had the matter of his book been orthodox, his manner would still have proved too unorthodox for that solemn age. The humour and

irony with which he clothed his presentation of scientific theories would have aroused distrust, even had the theories themselves been less original. The book was written in a language which Charles Darwin, a man with very little sense of humour, simply could not understand.

Professor Hering had obtained a hearing because, as Professor Marcus Hartog remarks, "Hering supported his view in language far more suitable for its presentation to the scientific public."

Science, like theology, has its own etiquette and its own language. Butler ignored both. He made no attempt to conciliate the sodality of science. He did not conceal his scorn for academic distinctions and he expressed the lowest opinion of that sacred college of science, the Royal Society. Professor Marcus Hartog, F.R.H.S., in his interesting Introduction to Butler's book, *Unconscious Memory*, sums up the situation very fairly.

To Butler "the professional man of science, with self-conscious knowledge for his ideal and aim, was a medicine-man, priest, augur—useful perhaps in his way, but to be carefully watched by all who value freedom of thought and person lest with opportunity he develop into a persecutor of the worst type. Not content with blackguarding the audience to whom his work should most appeal, he went on to deprecate that work itself and its author in his finest vein of irony. Having argued that our best and highest knowledge is that of whose possession we are most ignorant, he proceeds: 'Above all, let no unwary reader do me the injustice of believing in me. In that I write at all I am among the damned. If he must believe in anything, let him believe in the music of Handel, the painting of Giovanni Bellini, and in the thirteenth chapter of St. Paul's first Epistle to the Corinthians.'"¹

¹ *Unconscious Memory*, page xi, Introduction.

IV

Butler, just as he was finishing his book, came across Mivart's *Genesis of Species*, and was much impressed by his criticism of Natural Selection. It was this book which directed Butler's attention to the older evolutionists, notably Lamarck, whom Butler accordingly began to read with ever-increasing interest.

Butler's study of the older evolutionists convinced him that Darwin had been ungenerous to his predecessors. He accordingly wrote *Evolution, Old and New*, partly as an act of justice to the men whom Darwin had ignored, and partly because he did not think Darwinism an improvement on older methods of explaining Evolution.

Butler had no reason to hope that Darwin would enjoy his book, but the personal quarrel which resulted was due to a pure misunderstanding. I need not repeat the tedious story of this unnecessary quarrel—it is told in full in Butler's *Life*—and I will content myself with remarking that Butler was justified by the facts within his knowledge in believing that he had been badly treated. There was, as it happened, a perfectly satisfactory explanation of the misunderstanding, an explanation which Butler would have accepted. Darwin's instinct was to explain matters fully, but unfortunately he was persuaded by Huxley and Leslie Stephen to let the matter drop on the ground that Butler's first letter to the *Athenaeum* was "so ungentlemanlike as not to deserve an answer."

Sir Francis Darwin disagreed with Huxley and held that his father ought to have written. It is a great pity that Darwin disregarded his son's, and followed Huxley's advice. Butler was entitled to the correct explanation, and Huxley's attitude, that Butler should be treated with contemptuous silence, was a strange attitude for a man to take up who would have been the first to criticise a clerical attempt to withhold facts or information from the laity. On Huxley's own principles it was grossly unscientific to withhold from Butler any facts which were relevant to the issue,

facts which would have enabled him to form a true judgment on the matters in dispute.

We must not, however, forget that Butler was a freelance, poaching on scientific preserves. Huxley was a great man, but he was not uninfluenced by the narrower loyalties of the fraternity to which he belonged. His antipathy to Butler cannot be wholly explained by chivalrous resentment on Darwin's behalf. Huxley, one feels, must have regarded Butler much as the medical profession regards an unqualified practitioner, much as a sacerdotalist regards an irregular ministry without valid orders.

Butler, embittered by this personal quarrel, became more and more intemperate in his attacks on Darwin. How far his attacks were justified is a problem, the discussion of which must be postponed until a later chapter. For the moment I am only concerned to show that the story of the Darwin-Butler feud is not, as the impatient reader might be tempted to assume, irrelevant to the argument of this book.

It is, indeed, a useful reminder of the fact that truth is not confined to scientific societies, and inclines now to one side and now to the other in the secular quarrel between the specialist and the amateur. Every age, including our own, has its Butlers. The treatment meted out by the Victorian scientific world to Butler has its exact parallel—which I shall show in a later chapter—in the attitude of our own scientists to Commander Acworth, who is the Samuel Butler of our own day.

Butler, like other heretics, lived to see many of his ideas adapted and borrowed without acknowledgment.

Huxley, for instance, dismissed Buffon with contempt in his contribution to the *Encyclopædia Britannica* as a man "who had contributed nothing to the general doctrine of evolution." Many years later he wrote, "I am not likely to take a low view of Darwin's position in the history of science, but I am disposed to think that Buffon and Lamarck would run him hard in both genius and fertility. In

breadth of view and in extent of knowledge these two men were giants, *though we are apt to forget their services.*"

The italics are mine. But the name of the man who reminded the world of the services of Buffon and Lamarck, and was much abused for so doing, is not mentioned in Huxley's *Life* or in his letters.

Hering was the first to suggest that memory and instinct should be identified, and Butler developed this theory and defended it with far greater skill than did Hering. Butler's relation to the theory of memory was much the same as Darwin's to the theory of Natural Selection which was first enunciated by Mr. Patrick Matthew in 1831. Nothing, indeed, could be clearer or more definite than Mr. Matthew's anticipation of Darwin's own views as to the work of Natural Selection.¹

Yet, whereas the theory of Natural Selection is never referred to as "Matthewism," or even as "Matthew-Darwinism," scientists go out of their way to emphasise Hering at the expense of Butler.

In 1912 Professor James Ward delivered a lecture on "Heredity and Memory," a brilliant development of the Hering-Butler theories. No reader, however, could possibly gather from his allusions to Samuel Butler the great part Butler had played in the development of this particular theory.

Romanes attacked Butler bitterly, but this did not prevent him making play with Butler's phrase, "hereditary memory." The anonymous reviewer of Romanes' book, *Mental Evolution in Animals*, drew attention in *The Athenaeum* to this fact.

"The phrase 'hereditary memory' is due to Mr. S. Butler . . . and yet Mr. Butler's name is studiously avoided throughout Mr. Romanes' discussion."

The reviewer drew an amusing parallel between Samuel Butler and a character in one of George Eliot's novels, *Merman* by name.

¹ See the passage quoted from Mr. Matthew by Samuel Butler in *Luck or Cunning*, pages 90-91.

"*Merman . . .* finds some flaws in the theories of the great Grampus, 'whose book is cried up as a revelation,' and ventures on publishing his refutation. He is scoffed at by the initiated and becomes a bore to his friends, but has finally the doubtful satisfaction of seeing his modification silently adopted by the great Grampus. Mr. Butler would seem to have suffered some such fate at the hands of Mr. Darwin's literary executor Mr. Romanes."

The Darwinians were eminently successful. They contrived, not only to ignore, but to persuade the world as a whole to ignore anti-Darwinian critics like Mivart and Butler. They imposed their own high estimate of themselves, not only on their own disciples, but on men who should have waged relentless war against the philosophic doctrines which were the product of Darwinism. Bishops continued to hob-nob at the Athenæum with men who preached a philosophy pregnant with the seed of social disruption. Church and State and Society paid homage to philosophers whose doctrines endangered the very fabric of civilization, doctrines which were destined to provide the driving force behind Bolshevism. It is no accident that Darwin is almost the only Englishman referred to with unqualified reverence in Trotsky's Memoirs.

Darwin himself was by no means a militant atheist, but he was certainly not a Christian, and was indirectly responsible, more than any other individual of his century, for that decline in institutional religion which dates from the publication of the *Origin of Species*, and which is far from arrested to-day. And yet, when he died, the Church of England paid him the greatest compliment in her power, in spite of the fact that he had not subscribed to her formulas, and in spite of the fact that he had provided her most bitter enemies with ammunition. Charles Darwin was buried in Westminster Abbey, as if the Abbey were a mere Pantheon rather than a Christian church.

VI

It is only since Butler's death that his real merit has been

recognised. Sir Francis Darwin, Charles Darwin's son, paid him a generous, chivalrous tribute in his address to the British Association in 1908. Professor Marcus Hartog, in the Introduction which he wrote for Butler's book, *Unconscious Memory*, gives an impressive list of scientists who have been influenced by Butler's views, and concludes with the following tribute:

"We have now before us the materials to determine the problem of Butler's relation to biology and to biologists. He was, we have seen, anticipated by Hering; but his attitude was his own, fresh and original. He did not hamper his exposition, like Hering, by a subsidiary hypothesis of vibrations which may or may not be true, which burdens the theory without giving it greater carrying power or persuasiveness, which is based on no objective facts, and which, as Semon has practically demonstrated, is needless for the detailed working out of the theory. Butler failed to impress the biologists of his day, even those on whom, like Romanes, he might have reasonably counted for understanding and for support. But he kept alive Hering's work which it bade fair to sink into the limbo of obsolete hypotheses. To use Oliver Wendell Holmes's phrase, he 'de-polarised' evolutionary thought. We quote the words of a young biologist, who, when an ardent and dogmatic Weismannist of the most pronounced type, was induced to read *Life and Habit*: 'The book was to me a transformation and an inspiration.' Such learned writings as Semon's or Hering's could never produce such an effect: they do not penetrate to the heart of man; they cannot carry conviction to the intellect already filled full with rival theories, and with the unreasoned faith that to-morrow or next day a new discovery will obliterate all distinction between Man and his makings. The mind must needs be open for the reception of truth, for the rejection of prejudice; and the violence of a Samuel Butler may in the future, as in the past, be needed to shatter the coat of mail forged by too exclusively professional a training."

CHAPTER XII

CHARLES DARWIN—THE MAN

I

No reputation, however secure, will be accepted without question by the generations that follow, but though there will undoubtedly be readjustments in the hierarchy of eminent Victorians, the age as a whole has nothing to fear from such revaluations; for the balance will be more than restored by posthumous justice to men of genius, such as Samuel Butler, who failed to win the respect of their age.

We may concede without question the greatness of the Victorian age, and yet refuse to accept as infallible the Victorian verdict on the Victorian idols.

It is, for instance, permissible to review the evidence before agreeing that Charles Darwin combined the intellectual genius of Isaac Newton with the moral genius of St. Francis of Assisi.

The Victorian verdict on Darwin may be illustrated by a few characteristic tributes.

"Greatest of living naturalists . . . greatest of living men."—SIR RAY LANCASTER.

"Newton and Darwin stand together and for all time in the select company of the greatest men the world had ever seen."—PROFESSOR E. E. POULTON.

"Of Darwin's pure and exalted moral nature no Englishman of the present generation can trust himself to speak with becoming moderation. His love of truth, his singleness of heart, his sincerity, his earnestness, his modesty, his candour, his absolute sinking of self and

selfishness—these indeed are all conspicuous to every reader on the very face of every word he ever printed.”—
GRANT ALLEN.

The duties of the *advocatus diaboli* in the process for the canonisation of Charles Darwin were efficiently discharged by Samuel Butler.

Butler accused Darwin of acquiescing in the popular legend which had claimed him as the discoverer of evolution. Darwin, so Butler alleged, had tacitly claimed the theory of evolution by descent, and had signally failed in generosity to his predecessors.

“In the first edition of the *Origin of Species* Mr. Darwin did not allude to Buffon nor to Dr. Erasmus Darwin, he hardly mentioned Lamarck, and he ignored the author of the *Vestiges of Creation* except in one sentence. This sentence was so gross a misrepresentation that it was expunged—silently—in later editions. Mr. Romanes does not and cannot deny any part of this.

“I said Mr. Darwin tacitly claimed to be the originator of the theory of evolution, which he so mixed up with the theory of ‘Natural Selection’ as to mislead his readers.”

And again:

“Mr. Darwin has generally gone to good sources. The ground of complaint against him is that he muddied the water after he had drawn it, and tacitly claimed to be the rightful owner of the spring, on the score of the damage he had effected,”

which was, of course, Butler’s way of saying that he believed in evolution, but disbelieved in Darwin’s theory of evolution.

“It will take years,” wrote Butler, “to get the evolution theory out of the mess in which Mr. Darwin has left it. He was the heir to a discredited truth; he left behind him an accredited fallacy.”

So much for the prosecution. Let us open the case for

the defence with a quotation from Professor Marcus Hartog, a warm admirer of Butler.

"Butler never realised Charles Darwin's utter lack of sympathetic understanding of the work of his French precursors, let alone his grandfather Erasmus. Yet this practical ignorance, which to Butler was so strange as to transcend belief, was altogether genuine and easy to realise when we recall the position of Natural Science in the early 'thirties in Darwin's student days at Cambridge and for a decade or two later. Catastropharianism was the tenet of the day."¹

Darwin's "practical ignorance" of his predecessors was certainly greater than Butler ever suspected, but I think Professor Hartog has slightly exaggerated Darwin's remoteness from evolutionary speculation.

Darwin never failed to acknowledge that Lyell's *Principles of Geology*, his companion on the voyage of the *Beagle*, had been the source of his inspiration. Now in this book, as Dr. Milum reminds us, Sir Charles Lyell devotes an entire chapter to Lamarck. Sir Charles Lyell never lost his head, as did his other scientific contemporaries, during the Darwin epidemic. He was determined, and remained determined, that justice should be done to Lamarck.

In his tenth edition he reprinted the original extract of Lamarck's doctrine of transmutation, the extract which Darwin had read, and he added: "I have thought it right to do this in justice to Lamarck, in order to show how nearly the opinions taught by him at the commencement of this century resembled those now in vogue amongst a large body of naturalists respecting the indefinite variability of species, and the progressive development in past time of the organic world. There is no room, therefore, for suspicion that my account of the Lamarckian hypothesis, written by me thirty-five years ago, derived any colouring of my own views tending to bring it more into harmony with the theory since promulgated by Darwin."

¹ Introduction to *Unconscious Memory*, xii.

Darwin was most annoyed. He strongly objected to Darwinism being described as Lyell had described it, as a mere modification of Lamarck's doctrine of development and progression. In his correspondence with Lyell he dismisses Lamarck as "a wretched book from which I gained nothing." And yet, the longer that Darwin lived, the more pronounced became the Lamarckian tendency of his views.

"Practical ignorance" is not an adequate explanation of Darwin's failure to do justice to Lamarck and Erasmus Darwin. He came of evolutionary stock. His own grandfather was a distinguished preacher of evolution. He had not the least excuse for "practical ignorance." Evolution was in the air, though Darwin himself tried to deny this fact in his autobiographical sketch. "It has sometimes been said," wrote Charles Darwin, "that the success of the *Origin* proved 'that the subject was in the air' or 'that men's minds were prepared for it.' I do not think that this is strictly true, for I occasionally sounded not a few naturalists, and never happened to come across a single one who seemed to doubt about the permanence of species."

"This experience," charitably comments Professor A. Bateson, "may perhaps have been an accident due to Darwin's isolation. The literature of the period abounds with indications of 'critical expectancy'."

Darwin himself records an interesting talk which he had as a young man with a certain Dr. Grant. The doctor "burst forth in high admiration of Lamarck and his views on evolution. I listened in silent astonishment, and, as far as I can judge, without any effect on my mind. I had previously read the *Zoonomia* of my grandfather, in which similar views are maintained, but without producing any effect on me. Nevertheless, it is probable that the hearing rather early in life such views maintained and praised may have favoured my upholding them under a different form in my *Origin of Species*. At that time I admired greatly the *Zoonomia*; but on reading it a second time,

after an interval of ten or fifteen years, I was much disappointed; the proportion of speculation being so large to the facts given."

This is all very well, but however poorly Darwin may have thought of his predecessors and their attempts to solve the riddle of evolution, he undoubtedly failed in generosity by his omission to acknowledge that there were at least pioneers preaching evolution as a fact.

Darwin, undoubtedly, should have prefaced the first edition of the *Origin of Species* with an historical summary of evolutionary thought. He should have shown in what respect his own doctrine of evolution differed from the doctrine of his predecessors. Instead of which neither Buffon nor Erasmus Darwin, his own grandfather, were mentioned until at least six thousand copies of the book had been sold, and Lamarck was dismissed with a few contemptuous references.

Again, when Darwin found that the public were beginning to identify his contribution (Natural Selection) with the theory of evolution, he should at once have taken steps to rectify this injustice to his predecessors. He did none of these things. "We cannot help wondering," as Delage writes, "why Darwin did not recognise in Lamarck's doctrine the transmutation idea which served as the basis for his own theory."

II

Must we then assume that the prosecution have proved their case? I think not.

Darwin's relations with A. R. Wallace must be set against his failure to do justice to his predecessors.

The facts are as follows. Darwin had devoted eighteen years to preparing his thesis on "Natural Selection." He had completed about half of an expanded treatise on this subject in 1858. On June 18th of that year he was startled to receive a manuscript from the great naturalist A. R. Wallace who asked for his opinion on an essay which he had just written and which contained a complete state-

ment of Darwin's own views on Natural Selection. Darwin forwarded the essay to Lyell. "Your words have come true with a vengeance—that I should be forestalled. You said this when I explained to you here very briefly my views of 'Natural Selection' depending on the struggle for existence. I never saw a more striking coincidence; if Wallace had my MS. sketch written out in 1842, he could not have made a better short abstract!"

On June 25th he wrote as follows to Lyell:

"There is nothing in Wallace's sketch which is not written out much fuller in my sketch, copied out in 1844 and read by Hooker some dozen years ago. About a year ago I sent a short sketch, of which I have a copy, of my views (owing to correspondence on several points) to Asa Gray, so that I could most truly say and prove that I take nothing from Wallace. I should be extremely glad now to publish a sketch of my general views in about a dozen pages or so; but I cannot persuade myself that I can do so honourably. Wallace says nothing about publication, and I enclose his letter. But as I had not intended to publish my sketch, can I do so honourably because Wallace has sent me an outline of his doctrine?"

He added the following postscript the next day:

"Forgive me for adding a P.S. to make the case as strong as possible against myself.

"Wallace might say, 'You did not intend publishing an abstract of your views until you received my communication. Is it fair to take advantage of my having freely, though unasked, communicated to you my ideas, and thus prevent me forestalling you?'"

Lyell and Hooker decided to send Wallace's essay to the Linnean Society with an abstract of Darwin's work and a joint communication, of which the title was "On the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural Means

of Selection," was read to the Linnean Society on July 1st, 1858.

Darwin was equally generous when he discovered at a later date that the principle of Natural Selection had been independently recognised by Dr. W. C. Wells in 1813, and by Mr. Patrick Matthew in 1831.

I think, then, that we are entitled to conclude that Butler failed to prove his charge. The Darwin that emerges from a critical survey of the evidence is not, perhaps, the Darwin of Grant Allen, but still less the Darwin of Samuel Butler. Darwin was generous in his appreciation of those who shared or even to some extent anticipated his own particular theory of the evolutionary process, and though one cannot but regret, one can to some extent condone his failure to do justice to Lamarck.

Neither Lamarck nor Erasmus Darwin had converted him to evolution. It was not until he had independently satisfied himself of the *modus operandi* of evolution that his own belief in evolution became a reality. He had complete and sovereign contempt for the theories of the early evolutionists. "He was at first alone," as his son wrote, "or felt himself to be so in maintaining a rational workable theory of evolution. It was therefore natural that he should speak of 'my theory'."

It was so natural, in fact, that Darwin gradually began to think of himself as the pioneer of the evolutionary theory.

Darwin was naturally a very modest man, but no modesty could have been entirely proof against the flood of fulsome panegyrics of which he was the victim. Darwin was puzzled. He was never really convinced by the conspiracy to represent him "as the greatest of living men." It was with real conviction that he wrote, "I have no great quickness of apprehension or wit which is so remarkable in some clever men, for instance, Huxley."

None the less, the chorus of praise could not leave him entirely unaffected. The world at large had forgotten Lamarck and Erasmus Darwin. Charles Darwin was the

only name that counted in the history of evolutionary thought. It was only too easy for Darwin to acquiesce in this verdict. His acquiescence was the result, not of a conscious desire to claim laurels to which he was not entitled, but of a confused subconscious mental process. Darwin was not a very clear thinker nor a very clear writer. Samuel Butler, who was both, found it difficult to believe that Darwin's bad writing was entirely natural. He attributed the more confused passages to a desire, subconscious perhaps, to confuse the issue, a grotesque charge.

Darwin, in short, erred not as the result of conscious meanness, but as the result of a genuine prejudice against Lamarck based on a complete lack of sympathetic understanding for his work.

Butler's attack must have come as a rude shock, not only because it was the one discordant note in a chorus of praise, but because its patent injustice was difficult to disprove.

It is maddening for a man who is upheld by an overwhelming interior conviction of innocence to be confronted by apparently unanswerable evidence of guilt. The facts as marshalled by "that clever unscrupulous man Mr. Butler" were apparently damning, and yet Butler's presentation of the case was envenomed and unjust.

III

Darwin was consoled by the loyalty of the scientific world which treated Butler as if he was a pariah dog who had attempted to bite a saint.

Butler's attack was ignored, or rather countered by exaggerated references to Darwin's generosity. Professor Poulton, for instance, quotes with approval a tribute of G. H. Lewis to Darwin as "lavish in acknowledging the smallest debts he may owe." This is an over-statement. And surely it is a little disingenuous of Professor Arthur Thomson to write, "Darwin was characteristically frank and generous in admitting that the principle of Natural

Selection had been independently recognised." He should have omitted the "characteristically" in the above sentence, and should have added, "No sincere admirer of Darwin can, however, help regretting that he was not equally frank and generous in admitting that the principle of evolution by descent had been discovered by Lamarck and Erasmus Darwin. Undoubtedly, Darwin should have prefaced the first edition of the *Origin of Species* with a statement to this effect, and with a clear summary of the differences between his view of evolution and theirs. Unless we are prepared to admit that another standard of honour prevails in the scientific world than in other branches of learning, Darwin's failure in this respect must be a source of regret to his admirers, however little they may be prepared to endorse the unbalanced and envenomed verdict of Samuel Butler."

Samuel Butler, indeed, built up his case against Darwin entirely on the basis of Darwin's attitude to his predecessors. Apart from this, all the evidence proves that Darwin deserves the affectionate loyalty and reverence with which he was regarded by his contemporaries.

Darwin, indeed, remained unspoilt by success. Darwinism became one of the most dogmatic of creeds, but there was nothing dogmatic or self-assertive about Darwin. "Darwin was anything but dogmatic," wrote that great German biologist Driesch, "and yet Darwinism is dogmatism in one of its purest forms. . . . Darwin's polemics never left the path of true scientific discussions, he never in all his life abused anyone who found reason to combat his hypotheses, and he never turned a logical problem into a question of morality. . . . How different is this from what many of Darwin's followers have made out of his doctrines, especially in Germany; how far is 'Darwinism' removed from Darwin's own teaching and character."

Darwin was, indeed, too diffident ever to develop into a dogmatist. The whole tone of the "Origin" is, as his son said, "charming and almost pathetic; it is the tone of a

man who, convinced of the truth of his own views, hardly expects to convince others; just the reverse to the style of a fanatic who tries to force belief on his readers."

Nobody who visited Darwin in his own home could have any doubt as to his essential modesty. He did not realise that most of his visitors regarded it as a great honour to be received by him at Down. He never refused to see anyone, and when strangers wrote asking whether he would receive them, he always replied by conscientiously emphasising the distance of Down from London, and by pointing out the great inconvenience of the journey. He took it for granted, not only that they would find the journey as tedious as he did himself, but also that they might hesitate to make so tiresome a journey for so inadequate a reward.

"To some, I think," writes his son, "he caused actual pain by his modesty; I have seen the late Francis Balfour quite discomposed by having knowledge ascribed to himself on a point about which my father claimed to be utterly ignorant."

The portrait which emerges gradually, not only from Charles Darwin's Autobiographical Sketch, but from the biography by his son, is a charming and attractive portrait. It carries conviction, which is more than can be said for the bitter caricature of Samuel Butler. In Butler's justification it must always be remembered that Butler's dislike of Darwin was largely based on a misunderstanding which Darwin both could and should have removed, and which Darwin would indeed have removed, but for the intervention of Huxley.

IV

Was Charles Darwin a genius? Was his great reputation the reward of "luck or cunning"?

His academic career was undistinguished. He spent seven years at Shrewsbury without showing any signs of intellectual distinction. "You care for nothing," said his

father, "but shooting, dogs and rat-catching, and you will be a disgrace to yourself and all your family."

From Shrewsbury Darwin went to Edinburgh to prepare for the medical profession. His father soon came to the conclusion that he would not make a success as a doctor and decided that his son should take Orders. Charles Darwin accordingly matriculated at Christ's College, Cambridge, in 1828, and took his degree in 1831. He made no attempt to read for Honours, and finished tenth among those who entered for the pass degree. His main interest at Cambridge was entomology.

"But no pursuit at Cambridge was followed with nearly so much earnestness or gave me so much pleasure as collecting beetles. It was the mere passion for collecting, for I did not dissect them and rarely compared their external characters with published descriptions." He attempted mathematics, but without success.

"The work was repugnant to me, chiefly from my not being able to see any meaning in the early steps in algebra. This impatience was very foolish, and in after years I have deeply regretted that I did not proceed far enough at least to understand something of the great leading principles of mathematics, for men thus endowed seem to have an extra sense. But I do not believe that I should ever have succeeded beyond a very low grade."

This confession is interesting. In later years the criticism of Natural Selection which made most impression on him was contained in an article which appeared in the *North British Review* and which referred to "a vague use of an imperfectly understood doctrine of chance among Darwinian supporters, a misunderstanding which led Darwinians to believe that species could be changed by the survival of a few individuals in a century through a similar and favourable variation." Had Darwin been a mathematician he would have realised the immense odds against the possibility of a species being radically transformed by Natural Selection.

Darwin, as we have seen, gave no signs of unusual

intellectual powers, either as a boy or as a young man. Many minds mature late, and Darwin's seems to have been such a mind.

There is no evidence of genius in the following passage from his first book *The Voyages of the "Adventure" and "Beagle."*¹

"Earthquakes alone are sufficient to destroy the prosperity of any country. If, for instance, beneath England the now inert subterraneous forces should exert those powers which most assuredly in former geological ages they have exerted, how completely would the entire condition of the country be changed! What would become of the lofty houses, thickly packed cities, great manufactures [*sic*], the beautiful public and private edifices? If the new period of disturbance were to commence by some great earthquake in the dead of night, how terrific would be the carnage! England would be at once bankrupt; all papers, records and accounts would from that moment be lost. Government being unable to collect the taxes, and failing to maintain its authority, the hand of violence and rapine would go uncontrolled. In every large town famine would be proclaimed, pestilence and death following in its train."

Is it, perhaps, unkind to suggest that twenty years seems rather a short period to transform the Darwin of thirty-three who gave these great thoughts to the world into the Darwin of fifty-three who was hailed as the profoundest thinker of his age, "the greatest of living men"?

Darwin's warmest admirers could not describe him as a clear writer. "His English," complained Huxley, "is sometimes wonderful." Darwin was well aware of this fact. "I have as much difficulty as ever," he wrote in his autobiographical sketch, "in expressing myself clearly and concisely, and this difficulty has caused me a very great loss of time." His son, Sir Francis Darwin, tells us that Charles Darwin often laughed and grumbled at himself, "for the difficulty which he found in writing English,

¹ Quoted by Butler.

saying, for instance, that if a bad arrangement of a sentence was possible, he should be sure to adopt it."

Clear thinkers usually express themselves clearly, but it does not necessarily follow that confused writing is the product of confused thought.

Darwin's forte was, perhaps, observation rather than philosophy. He was an accurate observer, not only of natural phenomena, but also of his own mental processes. His own account of the mental processes whereby his religious convictions and æsthetic susceptibilities gradually atrophied is an excellent example both of his careful and accurate observation, and of his inability to draw logical deductions from such observations.

After describing the devotional mood produced in his mind by the grandeur of a Brazilian forest, he adds, "I well remember my conviction that there is more in man than the mere breath of his body, but now the grandest scenes would not cause any such feelings and convictions to rise in my mind. It may be truly said that I am like a man who has become colour-blind."

Darwin's theistic conviction gradually became weaker. His waning sense of the supernatural coincided with the decrease in his æsthetic susceptibilities. As a young man poetry gave him great pleasure; as an old man he tells us that he could not endure to read a line of it. "I have tried lately to read Shakespeare and found him so intolerably dull that it nauseated me. I have also almost lost my taste for pictures or music. My mind seems to have become a kind of machine for grinding general laws out of large collections of facts, but why this should have caused the atrophy of that part of the brain alone, on which the higher tastes depend, I cannot conceive."

Here we have Darwin recording accurately the changes in his own mental outlook. The weakness of his reasoning is at once apparent when he begins to philosophise.

He confesses that he is "impressed by the impossibility of conceiving this immense and wonderful universe, including man with his capacity for looking far backwards

and far into futurity, as the result of blind chance or necessity. Thus reflecting I feel compelled to look to a first cause having an intelligent mind in some degree analogous to that of man; and I deserve to be called a Theist. This conclusion was strong in my mind about the time, as far as I can remember, when I wrote the *Origin of Species*, and it is since that time that it has very gradually, with many fluctuations, become weaker. But then arises the doubt—can the mind of man, which has, as I fully believe, been developed from a mind as low as that possessed by the lowest animals, be trusted 'when it draws such grand conclusions.' . . . But then with me the horrid doubt always arises whether the convictions of man's mind, which has been developed from the mind of the lower animals, are of any value or at all trustworthy. Would anyone trust the convictions of a monkey's mind, and are there convictions in such a mind?"

A profound thinker would never have been guilty of such inconsistent reasoning. If Darwin was not prepared to trust his mind when it drew the "grand conclusion," that God existed, why was he prepared to trust it when it drew the depressing conclusion that a mind of such bestial origin could not be trusted to draw any conclusion at all?

Darwin's mind at different periods of his life led him to two firm convictions, (*a*) that God exists, and (*b*) that Man is descended from the lower animals.

If as the result of (*b*) he lost confidence in his own mental processes, he might well have rejected both beliefs, but to retain the latter belief, which was the source of his scepticism, and to reject the former, was illogical. It was, indeed, absurd to state on the same page that he "fully believed" in the bestial origin of his own mind, and that this same bestial origin did not entitle him "fully to believe" in anything.

It is difficult to understand the great popularity enjoyed by the *Origin of Species* outside scientific circles excepting on the hypothesis that fashion will create a circulation of the book of the moment irrespective of the style in which

it is written. "I have been reading the *Origin* again slowly," wrote Huxley, "with the view of picking out the essentials for the obituary notice. Nothing entertains me more than to hear people calling it easy reading. Exposition was not Darwin's forte—and his English is sometimes wonderful. But there is a marvellous dumb sagacity about him—like that of a sort of miraculous dog—and he gets to the truth by ways as dark as those of the Heathen Chinee."¹

Huxley was one of Darwin's warmest admirers. Indeed, he described himself as "Darwin's bulldog." Genius is a big word. Can we properly apply it to a man who, according to his warmest admirer (*a*) wrote bad English, (*b*) had no gift for exposition, (*c*) arrived at a conclusion by "ways as dark as those of the Heathen Chinee."

Darwin himself made no claim to outstanding talent. There is no reason to attribute to his modesty rather than to his habitual accuracy of observation his statement that he had "no quickness of apprehension or wit," or to doubt his own admirable summary of the reasons for his own scientific success.

"Therefore, my success as a man of science, whatever this may have amounted to, has been determined, as far as I can judge, by complex and diversified mental qualities and conditions. Of these, the most important have been—the love of science—unbounded patience in long reflecting over any subject—industry in observing and collecting facts—and a fair share of invention as well as common sense. With such moderate abilities as I possess, it is truly surprising that I should have influenced to a considerable extent the belief of scientific men on some important points."

¹ *Life*, Huxley, II.

CHAPTER XIII

THE BANKRUPTCY OF NATURALISM

I

THE *Concise Oxford Dictionary* defines naturalism as "a view of the world that excludes the supernatural or spiritual."

Naturalism, in other words, is a polite synonym for Atheism.

Now a philosophy in which there is no place for the supernatural or the spiritual is a philosophy in which there is no place for God. And yet most of the Victorians who championed a crudely mechanical view of the universe usually refused to describe themselves as Atheists. Their dislike of this uncompromising label was symptomatic of thinkers who shrank from clear-cut conclusions. They had not the courage of their own lack of convictions, the courage "to fashion faith even to a nought," the courage to answer by a frank, uncompromising negative the greatest of all questions, *utrum deus sit*.

The Victorian sceptics were, no doubt, unconsciously influenced by the purely snobbish prejudice which associates Atheism with vulgar and aggressive "anti-Godites" haranguing the crowds in Hyde Park, but "Naturalism" is only "atheism" in evening dress.

There is, however, no need to quarrel over words. Let us, by all means, use the politer term "Naturalism."

II

NATURALISM AND THE INDIVIDUAL

Theoretically, naturalism may be compatible with the belief in immortality, but those who reject supernaturalism

may be divided into those who dogmatically deny immortality and those who maintain that the evidence for immortality is most unconvincing.

Those who deny immortality may be divided into men who admit and men who shirk the logical consequences of this disbelief.

I find it difficult to understand the attitude of those who pretend to regard the extinction of personality with indifference, excepting on the assumption that they have made a sad mess of life. The dispirited failures may perhaps welcome the ringing-down of the final curtain on the play in which their rôle has been so futile and may even prefer extinction to the risk of repeating in another world their failure in this.

Suicide is the result of a failure of nerves, and surely the suicide who has no further use for life differs only in degree from the man who has no further use for life beyond the grave.

My window, as I write, opens on to a cherry tree in full bloom and snows retreating from fields on which the spring gentians have already staked their claim.

"And since to look at things in bloom
Fifty years is little room"

the Virgilian sense of tears in things mortal would mar my joy in perishable beauty, if I had no hope of a world of eternal values where beauty endures and where spring does not "vanish with the rose."

Fifty years is indeed little room not only for beauty, but also for the pleasures of the mind, too short to read all the books that I would like to read, too brief to explore all but a few of the fascinating avenues of knowledge. And, above all, too short for "laughter and the love of friends" and for the ties more sacred than friendship.

If death ended all, I hope I should be prepared to accept my fate without recrimination. But surely it is irrational for those who have found life good not to regret the awful brevity of life itself unless they are convinced that life on earth is a mere episode in the scheme of life eternal.

It is, of course, fashionable in certain circles to profess a lordly indifference to survival. Men who have attained to the wider view and larger vision profess themselves serenely remote from all interest in the petty problems of individual personality. In a recent series of broadcast addresses, published under the title *Points of View*, Mr. Wells has provided a listening world with a new criterion of intelligence.

"Our individuality," he writes, "is so to speak an in-born obsession from which we should escape as we become more *intelligent* . . . personality, individuality, is a biological device which has served its end in evolution and will decline. A consciousness of something greater than ourselves, the immortal soul of the race, is taking control of the direction of our lives."

I should like to book a ticket for Mr. Wells in his own Time Machine back to the thirteenth century. His writing would gain in grip if he could sit for a few months at the feet of Aquinas. He would learn from Aquinas that definition must precede discussion, and that it is a sin against Reason to avoid the trouble of exact definition by taking refuge in inexact metaphor. What does Mr. Wells mean by "the immortal soul of the race"? Does this phrase convey any clear-cut idea to Mr. Wells's mind? No, for Mr. Wells has refused to think out the implications of extinction. He shies away from the logical conclusion of that grim premise, and drugs his mind (and ours) with soothing phrases.

Aquinas put real work into his definitions. He thought out exactly what he meant by a word like "soul" before he proceeded to discuss the nature of the soul. Mr. Wells, on the other hand, throws a sonorous phrase like "the immortal soul of the race" to his readers in the hope that they will help him out by reading some meaning into the phrase in question.

Of course, the race is not immortal. It is doomed to final extinction in the shipwreck of the solar system. Mr. Wells's phrase is, therefore, inexact and indefensible.

Here is another instance of the substitution of metaphor for definition from Mr. Wells's *Outline of History*."

"The life to which I belong uses me, and will pass on beyond me and I am content."

It is absurd to begin by denying the existence of a personal Creator, and then to proceed to personify "Life." This confusion of thought is, of course, due to a failure of nerve. Mr. Wells has not the courage to face the bleak and scientific universe of Naturalism, a universe in which there is no single permanent achievement of the least value.

"The cosmic process goes on inexorably," writes Guenther. "There are no ends towards which the eternal changes are working. . . . On a small body in a corner of the universe certain beings were produced for a moment, to go rigid for ever with their planet in the next. Such is the story of mankind . . . the only possible scientific ethic is resignation."

Mr. Wells is, of course, astute enough to realise that his readers will find it difficult to resign themselves cheerfully to extinction unless they can be persuaded that they are of superior clay to those who still cling to immortality. It is, therefore, important to represent those who believe in immortality as irrational and those who desire immortality as ignoble. "Contemplate the starry heavens," exclaims the modern sceptic in the best pulpit manner, "and cultivate a sense of proportion. Why are you so interested in the survival of your own petty personality? Try and abandon this egoistic pre-occupation with personal identity."

But why should it be regarded as quite reasonable to wish to be alive fifty years hence, and egoistic to dislike the possibility of being extinguished fifty-one years hence?

If an eminent physician assured Mr. Wells that he would continue for fifty years in full possession of his faculties, with all that this implies, I doubt if he would reply, "My dear Professor, my interest in my puny personality is so

slight that I am indifferent whether I live for fifty days or fifty years. You see, I have just been looking at the Milky Way."

And if Mr. Wells would welcome the prospect of playing an active part in the great adventure of life, in, say, 1980, why should he reject as ignoble the prospect of walking on in a drama staged elsewhere in 2960?

Mr. J. B. S. Haldane, in his contribution to *Points of View*, remarks, "I shall last out my time and then finish. This prospect does not worry me, because some of my works will not die when I do."

I do not see that the evil of extinction is mitigated by the fact that a pale penumbra of personality—a man's work—survives the extinction of his real personality by a few years or even by a few centuries.

I should not, as it happens, doubt Mr. Haldane's sincerity if he confined himself to suggesting that he does not fear death.

I have it on good authority that few officers in the war showed a more indecent contempt for danger. He seems to have regarded death as a biological phenomenon of no importance. In this paper he tells us that as a biologist he is interested in his body. "I like to study the performance of mine as my friends do that of their motor-cycles or receiving sets. It amuses me to know what my heart does when I run upstairs." Mr. Haldane was also amused during the war to discover what his heart did when exposed to a variety of poison-gases with which he was experimenting. He used his body in the most dangerous of biological experiments. He has given proof that he does not fear death, but death is not extinction, and the man who does not fear death may well, and indeed should, dread extinction.

Mr. Haldane devotes a great part of his paper to discussing death-rates. "I am," he writes, "a citizen of the British Empire which includes the Great Dominions. Our highbrow friends complain that the Dominions have produced little great art or literature, and I answer that at least

they have done something unique. Before the war, the average expectation of life of a baby born in New Zealand was sixty years, in Australia fifty-seven years, in Denmark, the next healthiest country, fifty-six years. England also ran. I am proud to belong to a Commonwealth which has won the first and second places in the great race against death."

I cannot follow this reasoning. He tells us that it is a matter of great importance that Mr. Jones shall exist for sixty years rather than fifty years, but that it is a matter of no importance if he ceases to exist at sixty years instead of continuing to exist for all eternity. If we increase our expectation of life by ten per cent we need not worry about our contribution to literature and art, but it is a matter of indifference whether we succeed in proving that our expectation of life is eternal.

Mr. Haldane is a brilliant biologist. I have the most profound respect both for his brain and for his courage. Mr. Wells is one of the outstanding figures in modern Europe. I can only account for the contrast between their intellectual powers and their intellectual output on the subject of immortality by the fact that they both suffer from that Victorian complex, theophobia. Neither of them are really satisfied with Naturalism. Both of them pay tribute to the significance of absolute truth and absolute beauty, but neither of them apparently realise that the existence of absolute values obviously demands the existence of a Creator of those values.

Many years ago, a pagan poet summed up in a few lines, lines which haunt us by their beauty and their felicity of expression, the only reasonable philosophy for those who believe that the grave ends all.

"Vivamus, mea Lesbia, atque amemus,
Rumoresque senum serveriorum
Omnes unius aestimemus assis.
Soles occidere et redire possunt;
Nobis cum semel occidit brevis lux
Nox est perpetua, una, dormienda
Da mihi basia mille."

These lines are a touchstone of sincerity. "The immortal soul of the race" is a fine sonorous phrase, but we see it for what it is, thin unsatisfying stuff, when we set it beside the sad hedonism of Catullus.

NATURALISM AND THE RACE

Naturalism, as we have seen, holds out no hope for the individual, nor can the individual console himself with the reflection that life at least offers him the opportunity of contributing something of permanent value to the future of the race. For the human race, like the individual, is doomed to final extinction.

Mr. Bertrand Russell must be given credit for a courage, rare among sceptics, with which he faces the logical consequences of Naturalism. He writes as follows:

"That man is the product of causes which had no prevision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves and his beliefs, are but the outcome of accidental collocations of atoms; that no fire, no heroism, no intensity of thought and feeling, can preserve an individual beyond the grave; that all the labours of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system, and that the whole temple of man's achievement must inevitably be buried beneath the débris of a Universe in ruins—all these things, if not quite beyond dispute, are yet so nearly certain, that no philosophy which rejects them can hope to stand. Only within the scaffolding of these truths, only on the firm foundation of unyielding despair, can the soul's habitation henceforth be safely built."¹

Progress is a myth. Science does not support the shallow optimism of the more enthusiastic prophets of evolution. Evolution recognises no ethical values. Those who are fittest to survive are not necessarily "the best." "The

¹ "A Free Man's Worship," essay by Bertrand Russell.

theory of evolution," wrote Huxley, "encourages no millennial anticipations. If for millions of years our globe has taken the upward road, yet some time the summit will be reached and the downward route will be commenced. The most daring imagination will hardly venture upon the suggestion that the power and the intelligence of men can ever arrest the procession of the great year."

And again. "The prospect of obtaining untroubled happiness or of a state which can, even remotely, deserve the title of perfection, appears to me to be as misleading an illusion as ever was dangled before the eyes of poor humanity."

Naturalism can provide no real incentive for individual or corporate effort. At the best, Naturalism can only preach resignation.

By his special direction, three lines written by his wife were inscribed on Huxley's tombstone:

"Be not afraid, ye waiting hearts that weep;
For still He giveth His beloved sleep,
And if an endless sleep He wills, so best."

For all their beauty these lines are irrational. The "waiting hearts" had every reason to "be afraid", if they assumed that the sleep of death was an endless sleep.

IV

NATURALISM AND ETHICS

The Victorian rationalist was always incensed at the mere suggestion that immorality was the logical consequence of his creed. This foul slander, so he maintained, was the creation of envenomed and panic-stricken orthodoxy. It could not survive the most cursory study of available evidence, the evidence provided by the exemplary private lives of men like Huxley, Darwin and Tyndall.

In this, as in everything else, the Victorian rationalists were less rational than the Victorian bishops. The Victorian rationalists were living on Christian capital. They

had inherited from Puritan ancestors prejudices which were plainly inconsistent with their creed. The bishops were perfectly correct in asserting that the traditional morality depended on the traditional faith for they knew that chastity is difficult and vice easy, and that religion has only contrived to erect a very shaky barrier between man and the brute, a barrier which would collapse if man could be persuaded that, in effect, he was nothing better than a brute.

The militant "rationalist" was usually a well-meaning but muddle-headed man. The much-advertised austerity of his own private life was a tribute, as he failed to realise, to the Christian tradition which he was doing his best to destroy. His artless belief that the Christian code would survive the Christian creed was sustained by a mystical confidence in the common sense of mankind, that common sense which would prevent mankind taking the rationalist very seriously. The rationalist though he devoted all his energies to proving that men were no better than the beasts would have been startled and surprised had mankind begun to behave like beasts. It was because his own muddled code bore no relation to his own muddled creed that he assumed that a similar divorce between creed and code would prevent a permanent feature of any society which rejected supernaturalism. We, who have seen a great country officially adopting materialism as its national creed have less excuse than Bradlaugh or Haeckel for failing to appreciate the accurate relationship between creed and code.

I admit, of course, that naturalism is not inconsistent with a scheme of rewards and punishments. To the murderer who pleads that he is the servant of natural law, and as such is not responsible for the crimes which he has committed, the judge is fully entitled to reply, "Neither am I responsible for condemning you to death. Console yourself with the reflection that the execution which will take place in four weeks' time will be the result of 'a mutual inter-reaction according to definite laws of the

forces possessed by the molecules of the primitive nebulosity of which the universe consisted.'"¹

Society will always find means for dealing with crimes against life and against property, and a prudent fear of punishment will always be a powerful social factor even in a materialistic state. But conscience, a far subtler social factor, would disappear in a social state where the citizens were saturated with the doctrines of naturalism.

Conscience and moral judgment are out of place in a world of machines. If a dishonest and plausible salesman palms off on you a second-hand car which breaks down on its first hill, you will be disappointed with the car and indignant with the salesman. You will reserve your moral judgment for the salesman. If however you are a consistent determinist you will be forced to admit that the salesman was no more responsible for his moral defects than the car for its mechanical defects. You will have no right to discriminate between moral and material defects.

Whatever may be the case with the moral indignation provoked by the failings of other people, there is, at least, something to be said for the social value of the moral indignation provoked by one's own misdoings. "It may be," as Lord Balfour remarked, "a small matter that determinism should render it thoroughly irrational to feel righteous indignation at the misconduct of other people. It cannot be wholly without importance that it should render it equally irrational to feel righteous indignation at our own. Self-condemnation, repentance, remorse, and the whole train of cognate emotions, are really so useful for the promotion of virtue, that it is a pity to find them at a stroke thus deprived of all reasonable foundation, and reduced, if they are to survive at all, to the position of amiable but unintelligent weaknesses."²

¹ Huxley.

² *The Foundations of Belief*. Being Notes Introductory to the Study of Theology. By The Right Hon. Arthur James Balfour. (Longmans, Green & Co.)

Materialists have tried to explain morality as an ingenious trick whereby Nature contrives to cheat the individual by subordinating some at least of his inclinations to the good of the race. I do not think our sophisticated descendants will be so easy to deceive. They will smile at this well-intentioned trickery of Nature. They will argue that they owe no duty to the race, that the race consists of individuals like themselves, individuals who are permitted a few brief, futile moments of consciousness before they pass out into the eternal night. Why should the individual Jones incommodate himself for the individual Brown, Robinson and Smith.

Altruism for the benefit of one's immediate family or closest friends might survive, but sacrifice for mere abstraction such as the race or posterity would disappear rapidly in a society saturated with naturalism.

A lady, for whom I have a great respect, and who is associated with many public movements was discussing the breakdown of moral restraint since the war. Religion, she explained, had failed. The young people no longer went to church, and were unimpressed by appeals to the Christian code. What was the remedy? "Education is the remedy," she continued, "education and eugenics. We must teach the young people that this sort of thing is bad for the race. We must impress on them their duty to the race."

My friend had, of course, been affected by the modern habit of indulging in great windy generalizations, generalizations which they never condescend to test by a concrete case. If my friend is right some such scene as this should be quite probable.

A moonlight night on the river. Two young people who are passionately in love with each other, and who are just on the point of yielding to one of the strongest forces in Nature. Both of them are thoroughly modern young people, and have, of course, no use for religion. Would the following scene in a novel impress you as plausible?

"No, my dear, I am sorry. I have changed my mind. I

was forgetting about the future of the race. Self-restraint has a definite eugenic basis."

"I suppose you are right," mutters Romeo reluctantly, "it was only the other day that I was reading a little tract which proved conclusively that chastity has its own little niche in the evolutionary process. I think we had better go home dear and look up the reference."

One would have to be indeed sanguine to hope for a Puritan reaction based on the eugenic appeal.

The Victorian rationalists were easily pleased. "We do not ask," they said in effect, "for the consolations of prayer. We are resigned to extinction when we die. We have lost all proper conceit, and are not in the least distressed by your clear, concise proof of our bestial origin. We are prepared to welcome the chimpanzee as a cousin. But there is one great figure associated with the traditional religion which we insist on retaining. Whatever happens you must not rob us of Mrs. Grundy."

The Georgian rationalist is made of sterner stuff. He has no use for Mrs. Grundy. On both sides of the Atlantic a spirited attack has been launched on Christian morality. Judge Lindsey, an American, champions companionate marriage in more than one readable and widely read book. Companionate marriage differs from the normal form of that much-abused institution, in that it is intended for young people who wish to live together without children. A *bona fide* intention to avoid that catastrophe is an essential condition of companionate marriage. Companionate marriage can be terminated, but the wife "is not entitled to alimony as in divorce." Mr. A. and Miss B. are to be allowed to live together for as long as they please without the stigma which attaches itself to illicit relations, and with none of the inconveniences which attach themselves to legal marriage.

Mr. Bertrand Russell, in his book *Marriage and Morals*, cordially supports the learned judge. He is still to some extent infected by the Christian tradition, as he maintains that "the stability of marriage" is a matter of "considerable

importance" where there are children. But he attaches no importance to sexual relationships which are childless. He regrets that happy marriages should still be imperilled by the foolish prejudices which still linger in society against casual infidelity. He assures us that it is thoroughly unhealthy for either husband or wife to "close their minds against the approaches of love from elsewhere." A little adultery every now and then oils the wheels of marriage.

These views would have shocked those serious folk the Victorian agnostics. The Victorian agnostic attacked the Christian creed. His grandson is questioning the credentials of the moral code which was founded on that creed. The grandfather, if he is still alive, is finding it rather difficult to discover the correct answer. I sympathise with the grandson. Of the two, he seems to be better entitled to describe himself as a rationalist. I have never been able to solve the riddle of those "who have not got the faith and will not have the fun." That mistake, at least, is avoided by the prophets of the New Morality.

Mr. Bertrand Russell, of course, lives in a country which is still nominally Christian, and which is still very largely influenced by the Christian tradition. In consequence, Mr. Russell would be condemned by his Bolshevik friends as a very half-hearted materialist. The Russian materialist is far more consistent, and we should indeed be grateful to the Russians for carrying out with magnificent thoroughness two great experiments. The English, with their traditional love of compromise, have never put Communism into practice as a political, or materialism into practice as a philosophic creed. Russia is the proper laboratory for experiments of this description. Thanks to Lenin, we are now in a position to know exactly what results follow when a nation is saturated with the materialistic creed. The Russians, unlike our own anaemic English materialists, have had the courage both to practise and to preach materialism. They have succeeded, where we have failed, in living *down* to "naturalism." The

accuracy of the following account of conditions in Russia cannot be disputed, for it appeared originally in the Bolshevik paper *Pravda*, and was quoted from that paper in René Fülöp Miller's monumental work, *The Mind and Face of Bolshevism*:

"Our young people have certain principles in affairs of love. All these principles are governed by the belief that the nearer you approach to extreme, and, as it were, animal primitiveness, the more communistic you are. Every 'Komsomolets,' even every member of a labour faculty, whose aim is to raise the intelligence of the working classes, every student, man or girl, considers it as axiomatic that in affairs of love they should impose the least possible restraint on themselves. A second main proposition in these axioms of love is as follows: 'Every "Komsomoltsa," every "Rabfaka,"¹ every woman student, on whom the choice of one of these young men of strong principles has fallen, must obey unquestioningly.' The third point of the system, which, in practice, is always at the same time a drama, is also a principle. The figure of the doctor appears . . . this is the revolution of 'Komsomolets love'!"

"Madame Smidovich," continues Fülöp Miller, "quotes cases which she declares to be typical: for example, one day two sixteen-year-old fathers appeared before the amazed officials of the Foundling Hospital with a 'collective child.' For some years, commissions have existed which have to give their consent in individual cases to legally permitted abortions. This consent is given in cases where large families, illness, or social conditions justify interference, and also when a woman student is in her last term. Madame Smidovich also gives an account of 'African Nights,' which are held in the Communist young people's organisations. From what she says these institutions owe much of their success to these affairs. That it is the girls who suffer from conditions of this kind is shown by the fact that of the promoters of these 'African Nights,'

¹ Woman student at a "labour faculty".

seventy per cent are young men and only thirty per cent girls.

"These conditions frequently lead directly to a terrorising of their girl comrades by these lads. Madame Smidovich quotes the case of a quite young girl who refused a proposal after two attempts and was rewarded with insults. In this heavy sexual atmosphere suicides abound. Much of the blame for all this is due not only to the new theories, but also to the frightful housing conditions and the undisciplined way of living of young people. As is well known, there is no public criticism in Soviet Russia, so all the newspaper accounts of occurrences of this kind are influenced by the Government; this is the only possible explanation of the fact that you find only reproaches levelled against 'disgusting bourgeois ideas,' and no unprejudiced judgments on the unparalleled debauchery and its immeasurably harmful effect on the young."¹

An appalling picture? Perhaps, but naturalism provides us with no criteria for preferring our own bourgeois ideals to the "unparalleled debauchery" of modern Russia. Debauchery, no less than chastity, is the inevitable result of the mutual inter-reaction according to definite laws of natural forces which are unaffected by moral judgments.

V

NATURALISM AND TRUTH

"I believe that truth is to be preferred to falsehood" is the first article in the scientific creed, but Naturalism provides the scientist with no justification for his faith. Theism, and theism alone, can provide the scientist with a rational basis for his creed.

Theism, far from being in conflict with science, is required as a working hypothesis without which science itself has no justification. This view had, indeed, been put forward as early as 1894 by Mr. Arthur James Balfour, who wrote as follows:

¹ *The Mind and Face of Bolshevism*, by René Fülöp Miller. (Putnam's Sons, Ltd.)

"Theism, then, whether or not it can in the strict meaning of the word be described as proved by science, is a principle which science, for a double reason, requires for its own completion. The ordered system of phenomena asks for a cause; our knowledge of that system is inexplicable unless we assume for it a rational Author. . . . On the naturalistic hypothesis, the whole premises of knowledge are clearly due to the blind operation of material causes, and in the last resort to these alone. On that hypothesis we no more possess free reason than we possess free will. As all our volitions are the inevitable product of forces which are quite alien to morality, so all our conclusions are the inevitable product of forces which are quite alien to reason."¹

A quarter of a century later, Professor Eddington had developed Mr. Balfour's contention that unaided science is impotent to justify its existence or to vindicate its criteria, or even to prove that truth should be preferred to falsehood.

"If, for example, we admit that every thought in the mind is represented in the brain by a characteristic configuration of atoms, then if natural law determines the way in which the configurations of atoms succeed one another it will simultaneously determine the way in which thoughts succeed one another in the mind. Now the thought of '7 times 9' in a boy's mind is not seldom succeeded by the thought of '65.' What has gone wrong? In the intervening moments of cogitation everything has proceeded by natural laws which are unbreakable. Nevertheless we insist that something has gone wrong. However closely we may associate thought with the physical machinery of the brain, the connection is dropped as irrelevant as soon as we consider the fundamental property of thought—that it may be correct or incorrect.

¹ *The Foundations of Belief*. Being Notes Introductory to the Study of Theology. By The Right Hon. Arthur James Balfour. (Longmans, Green & Co.)

The machinery cannot be anything but correct. We say that the brain which produces '7 times 9 are 63' is better than the brain which produces '7 times 9 are 65'; but it is not as a servant of natural law that it is better. Our approval of the first brain has no connection with natural law; it is determined by the type of thought which it produces, and that involves recognising a domain of the other type of law—laws which ought to be kept, but may be broken. Dismiss the idea that natural law can swallow up religion; it cannot even tackle the multiplication table single-handed."

Science, of course, in so far as it increases our material comfort, requires no justification, but the true scientist would not stoop to defend his creed on the ground that science provides us with wireless, drainage and motor-cars. These things, he regards as the mere by-product of his ideal quest.

It is significant in the hierarchy of science that the discoverers take rank in inverse ratio to the practical value of their discoveries. Everybody has heard of Einstein, and yet most of us would find it extremely difficult to explain in what precise respect relativity had brightened our lives. Few people, on the other hand, would deny that the invention of anaesthetics has proved a greater practical boon to suffering humanity than any other scientific discovery. And yet, for ten thousand who have heard of Einstein, there is scarce one who has heard of men like Guthrie, Flourens, Horace Wells and Sir James Simpson, the pioneers in anaesthetic discovery.

The science which gave us anaesthetics requires no defence, but the theist alone can find a place in his scheme for Browning's entymologist.

"One friend of mine wears out his eyes
Slighting the stupid joys of sense
In patient hope that ten years hence
'Somewhat completer,' he may say
My list of coleoptera."

If truth be, as the theist believes, an aspect of the

divine, no knowledge is useless which throws light on the plan of creation.

VI

NATURALISM AND AESTHETICS

Naturalism cannot explain the reaction to beauty, for naturalism provides no basis for discriminating between a grouping of atoms which produces beauty on the one hand or ugliness on the other hand. The chatter of a chimpanzee and a sonata rendered by Kreissler have precisely the same status in the world of natural law.¹

SUMMARY

Naturalism is bankrupt. It offers us a universe without significance, a creed without a code, and life without hope. It deprives science of its rationale, beauty of its value, and history of its meaning.

The bankruptcy of naturalism does not, I admit, demonstrate the truth of supernaturalism. We cannot *prove* that the universe is not irrational, but we *know* beyond all need of proof that unreason does not rule the universe. The scientists, no less than the theologians, tacitly assume that the universe is rational, an assumption which naturalism is not entitled to make, an assumption which forces us back to some form of supernatural philosophy as the only possible escape from the materialistic impasse.

¹ See *Men's Creatrix*, by the present Archbishop of York, for an interesting discussion of the relations between religion and æsthetics.

CHAPTER XIV

WHY "RATIONALIST"?

"**RATIONALISM**, n., practice of explaining the supernatural in religion in a way consonant with reason, or of treating reason as the ultimate authority in religion as elsewhere; theory that reason is the foundation of certainty in knowledge (opp. empiricism, sensationalism)." (*The Concise Oxford Dictionary*.)

I

RATIONALISM owes much of its success to its name. It was a stroke of genius to invent a name which begs the whole question at issue, and a triumph of audacity to persuade Christians to describe their opponents as rationalists, thus labelling themselves by implication as anti-rational. The question at issue is not whether reason was to be preferred to unreason, but whether the theistic or atheistic conceptions of the universe is the more rational, in other words whether the theists are right. Had the rationalist described themselves as "rightists" the impertinence would have been more obvious. But, in effect, no greater, for "rationalist" means "rightest," seeing that conclusions based on reason are right, and conclusions which are based on unreason are wrong.

I have no serious quarrel with the genuine agnostic who suspends his judgment. That the available evidence is insufficient to demonstrate either theism or atheism is a claim for which a reasonable argument can be advanced, but the missionary enterprise of Victorian rationalism was directed, not by genuine agnostics, but by men who were convinced that they had arrived at a satisfactory

"gnosis," and that it was their duty to deprive their fellow-men of the consolations of religion.

Their gloomy faith was the spiritual product of Puritanism. Calvin made things uncomfortable for the cheerful sceptic, and the Victorian rationalist tried to make things equally uncomfortable for the cheerful believer. To those who argued that even if atheism were true, it would still be best to leave people the comforting illusion of a loving God, the militant rationalist replied sternly that truth is always to be preferred to falsehood, and that we should sternly set our face against the use of palliatives.

Now if rationalism be, as the rationalists claim, founded on reason, the rationalist must be prepared to prove the first article of his creed—"I believe in Truth." But the rationalist who is challenged to demonstrate that truth is always to be preferred to falsehood shows signs of irritation as if you were taking an unfair controversial advantage. He is apt to reply that there are certain axioms which no sensible man should be required to prove. There well may be, but the obligation of truth is not one of them.

Professor Julian Huxley, for instance, wrote a long book, *Religion without Revelation*, in which he dismissed in one paragraph the belief in a personal God. "It is quite clear," he wrote, "that the idea of personality in God is put there by man." Of course, if this is quite clear, there is nothing more to be said, and we need not pause to refute the long array of proofs for a personal God which have been advanced by a long array of unenlightened thinkers, Greek, Roman and Christian. Professor Huxley, with all that fine, hearty confidence of the man whose creed is based not on reason, but on faith, expects us to accept, not only his negations, but his beliefs on trust. "What then, do I believe?" he writes. "I believe, in the first instance, that it is necessary to believe something. Complete scepticism does not work." Perhaps not, but the Christian would not expect Julian Huxley to accept

theism merely because "complete atheism does not work." For the Christian realises that a creed must be supported by reason no less than by expediency.

Huxley continues, "Truth is not merely truthfulness; it is also discovery and knowledge. I believe that the acquisition of knowledge is one of the fundamental aims of man; that truth will, in the long run, prevail, and is always to be preferred to expediency."

Aquinas, a rationalist living in an age of reason, did not begin by assuming, but by proving the articles of his creed. He developed his system, not from a highly arguable proposition such as the theorem that truth is always to be preferred to expediency, but from such modest premises as the axiom that nothing moves unless it has been set in motion.

No pupil of Aquinas would have been allowed to *assume* that truth should always be preferred to falsehood. He would have been expected to prove his proposition, and if he had been unable to do so, he would have been sent to the bottom of the class and required to write out in a fair flowing hand the twenty-third chapter of the second book of the *Summa Contra Gentes*, in which Aquinas proves that the first cause of the universe is mind, and that the last end of the universe must be the good of mind, that is truth, and that in the contemplation of truth man finds the principal object of wisdom.

That truth is always to be preferred to expediency is a logical deduction from theistic premises. That expediency should always be preferred to truth is a no less logical deduction from atheistic premises.

Certain configurations of matter produce in one brain the illusion of an all-loving God, in another brain the conviction that God Himself is a figment of the imagination. Now on the atheistic assumption the movements of matter in the brain of the atheist are alike the product of natural law. By what right do those who maintain the supremacy of natural law discriminate between these varying sequences of matter, sequences dictated by that

law? By what right does the atheist despise the victim of grovelling superstition? By what right does he take pride in his own intellectual superiority? Credulity and scepticism are alike the outcome of forces over which neither atheist nor believer have the least control. And by what right does the atheist seek to deprive the superstitious of their superstitions?

If life be nothing more than the flicker of a candle for a few fitful moments, and consciousness be nothing more than an idle spectator powerless to control the chance conglomerations of matter which create the illusion of personality, if the universe be nothing more than an endless rearrangement of atoms without plan and without purpose, why in the name of reason should we refuse by the drug of consoling falsehood to dull the edge of mental pain, and to render as easy as possible our pointless passage from the darkness of the womb to the oblivion of the grave?

What rational answer can the rationalist advance against the arguments of Cicero who declared that even if immortality was an illusion, he would still prefer to go through life consoled by this illusion, knowing full well that if he was mistaken the sceptics would never have the laugh of him in the next world.

"Quod si in hoc erro, qui animos hominum immortales esse credam, libenter erro nec mihi hunc errorem, quo delector dum vivo, extorqueri volo; sin mortuus, ut quidam minuti philosophi censem, nihil sentiam, non vereor ne hunc errorem meum philosophi mortui irrideant." (*De Senectute*, XXIII, 85.)

II

It is, perhaps, not surprising that a philosophy which cannot prove, and which is impotent to justify its fundamental assumptions, should be riddled through and through with inconsistencies.

The note of moral indignation which permeates rationalistic literature is essentially irrational. Indignation

is a luxury in which the determinist is not entitled to indulge. The consistent rationalist cannot reproach Rome with the Inquisition, for Torquemada, like Bradlaugh, represents a legitimate product of natural law. Only those who believe in free will can rationally demand religious freedom. The only possible ethic for the determinist is resignation, the only rational attitude is acquiescence in the *status quo*. The *status quo* is inevitable, therefore the *status quo* is right.

A determinist is entitled to take precautions against crime just as the natives of an Alpine valley take precautions against avalanches, but the consistent determinist has no right to pass moral judgments either on criminals or on avalanches. He is entitled to hang but not to criticise a murderer, to regret but not to despise stupidity, to resist but not to resent injustice, to promote but not to admire virtue.

The consistent determinist is not even entitled to say "You ought." "You ought" takes him into a region where the writ of natural law no longer runs. "You ought" is, of course, the driving force behind all missionary endeavour. "You ought to be a Christian," says the S.P.G., and is entitled to say it, for the S.P.G. recognises that every man is free either to accept or to reject Christianity. "You ought to be a rationalist," says the militant rationalist, to which the Christian is entitled to reply, "My dear sir, on your own showing my beliefs are determined for me by the movements of matter. Why, then, should you seek to alter them?"

The militant rationalist cannot afford to be consistent, or he would cease to be militant. "Drink, for you know not whence you come nor why," is the only logical deduction from his premises. Hedonism, grave or gay, is the only possible creed for the atheist. Hence the paradox that the drive behind militant atheism is essentially a religious impulse. The atheist who wishes to convert the world to his views is sustained by irrational mysticism, by the mystical belief that truth is always to be preferred to

falsehood. Mysticism may be either rational or muddled. The conviction that the great mystics are in touch with ultimate reality is a rational deduction from theistic premises, but an atheist who worships absolute truth is guilty of muddled mysticism, for this belief is inconsistent with the very basis of the atheistic creed.

It is difficult for a determinist to be consistent. He cannot even describe his own philosophy without contradicting himself. Mr. Cohen, for instance, that plucky survivor of Victorian materialism, is the editor of a periodical in which he proclaims week by week that free will is an illusion, that there is no such thing as free thought, and consequently no such person as a free-thinker. And the name of the periodical in question is *The Free-Thinker*. From which it would seem to follow that the free-thinker is a man who disbelieves in the possibility of free-thinking.

I suggest that Mr. Cohen should rechristen his paper.

III

The Victorian rationalist committed, in all innocence, most of the dreadful crimes of which the Christian is so freely accused. The militant rationalist was more dogmatic than the most dogmatic of ultramontanes, and with far less excuse, for the ultramontane, at least, makes some show of justifying his creed by reason.

Rationalism is based on blind faith. The Christian begins by proving, the rationalist by assuming the first articles in their respective creeds.

The Christian is often accused of taking refuge from truth in a world of pleasant dreams, and of refusing to follow truth "to whatever abysses truth may lead." But it is the rationalist, not the Christian, who lacks the courage to face the more depressing implications of his creed. Few sceptics are candid enough to admit the bankruptcy of naturalism. They tend to evade this issue with pious phrases about progress, "absolute values," and so forth, and above all by a naïve faith in science. The Victorian

rationalist was convinced that if bishops could only be replaced by biologists the world would be a better and a brighter place. He was inspired by a mystical faith in the supreme importance of scientific discovery, irrespective of its practical results. He believes, as Julian Huxley believes, that "the acquisition of knowledge is one of the fundamental aims of man." It matters little whether the knowledge in question is useful or useless. According to this creed, an astronomer who discovers a remote planet on the outskirts of the solar system would have every reason to feel vastly elated, and to assume that he had made a contribution of great importance to the sum total of human knowledge.

But naturalism, as we have seen, lends no support to this view. Science cannot be more significant than life itself, and if life itself is futile, the acquisition of scientific knowledge is of no importance. The scientist anxious for a reasoned vindication of his deepest convictions, the conviction that "the acquisition of knowledge is one of the fundamental aims of man," must fall back upon Aquinas. That is the tragedy of rationalism. The rationalist cannot defend by the reason to which he appeals the first article of his creed. "I believe in truth," says the rationalist, but he must turn to the theist to justify that belief. "I believe in reason," he continues, and naturalism replies that reason and unreason are alike the products of natural law. "I believe in science," continues the rationalist in despair, and the theist smiles, for he knows that theism alone can vindicate the idealism of science and alone can provide a reasoned basis for that mysticism which is the true inspiration of scientific research.

CHAPTER XV

“SIT DOWN BEFORE FACT”

I

THE real importance of a controversy is often hidden from the combatants. Huxley and Gladstone both believed that the “impregnable rock of Holy Scripture” was the issue which was at stake in their famous duel. The sceptics hoped, and the orthodox secretly feared, that Huxley’s dialectical triumph would prove a serious blow to supernatural religion. Both were mistaken. Religion survived Huxley’s attack on Genesis, and the only permanent result of the Huxley-Gladstone debate has been to substitute one legend for another. The man in the street has ceased to believe in the accuracy of Genesis, and is in danger of believing in the infallibility of scientists.

Huxley’s victory in this debate made a profound impression on the public, for it was represented as the victory of a scientist concerned only to discover the truth over a theologian desperately anxious to rig the evidence in order to buttress a shaky creed. The scientist, so the man in the street argues, is briefed by truth, the theologian by his Church. This simple dichotomy, so flattering to the scientist, so discreditable to the theologian, persists to this day.

The fact is that a dispassionate review of the truth is no more common among scientists than among theologians. The human mind welcomes facts which confirm, and evades facts which tend to upset preconceived theories. A determination to follow the evidence at all costs is the hallmark of authentic greatness, and real greatness is no more common in the Royal Society than in the College of Cardinals.

Scientists, to do them justice, are usually scientific enough to be immune from those illusions about science which are common among the laity. Huxley at least had no such illusions, and described "pedantry and jealousy" as the two besetting sins of scientific men.¹ Moreover, as a young man, Huxley wrote a letter which Gladstone might well have quoted had he desired to prove that scientists were quite capable of suppressing inconvenient truths in their own private or corporate interests :

"You have no notion of the intrigues that go on in this blessed world of science. Science is, I fear, no purer than any other region of human activity; though it should be. Merit alone is very little good; it must be backed by tact and knowledge of the world to do very much.

"For instance, I know that the paper I have just sent in is very original and of some importance, and I am equally sure that if it is referred to the judgment of my 'particular friend'—that it will not be published. He won't be able to say a word against it, but he will pooh-pooh it to a dead certainty.

"You will ask with some wonderment, Why? Because for the last twenty years — has been regarded as the great authority on these matters, and has had no one to tread on his heels, until at last, I think, he has come to look upon the 'Natural world' as his special preserve, and 'no poachers allowed.' So I must manoeuvre a little to get my poor memoir kept out of his hands.

"The necessity for these little stratagems utterly disgusts me. I would so willingly reverence and trust any man of high standing and ability. I am so utterly unable to comprehend this petty greediness."²

But, of course, no verdict on a class should be based on an admittedly poor specimen of that class. The eminent scientist, whose name is discreetly suppressed by the biographer in the above passage, was probably a very poor specimen of the Victorian scientist. On the other hand,

¹ *Life*, I, page 116.

² *Ibid.*, I, page 97.

Huxley himself was an example of the Victorian scientist at his best. He was the soul of honour in his relations with his colleagues, rivals and subordinates. He never schemed for his own ends, and he was incapable of jealousy. Few men were more respected in his day even by those who detested the views which he expounded.

Huxley himself would have wished to be judged by the scientific code whose tenets he defined in a famous letter to Charles Kingsley.

"Science seems to me to teach in the highest and strongest manner the great truth which is embodied in the Christian conception of entire surrender to the will of God. Sit down before fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses Nature leads, or you shall learn nothing. I have only begun to learn content and peace of mind since I have resolved at all risks to do this."

A fine ideal, but unfortunately the scientist finds it no easier to live up to the scientific ideal than the theologian to the Christian ideal. The reactions of Huxley, a scientist of undoubted integrity, to unwelcome facts, were much the same as the reactions of the more simple-minded believers to the fossils which appeared to throw doubt on Genesis.

The sincerity of Huxley's determination to "sit down before fact" was subjected to a severe test by the invitation which he received to examine the mediumship of David Home.

David Home, whose career is summarised in a later chapter of this book, was the greatest physical medium that ever lived.

"A highly desirable characteristic of Home's mediumship," wrote that eminent scientist Lord Rayleigh, "was the unusual opportunity allowed to the sense of sight. Home always objected to darkness at his séances."

Home's mediumship created such a sensation that a committee was appointed by the Dialectical Society of London to investigate the phenomena which he was alleged to produce.

Thirty-four gentlemen of standing were appointed, including well-known physicians, surgeons, barristers, and two fellows of scientific societies. The Dialectical Society fully expected and hoped that the committee would receive evidence establishing the fraudulent basis of the alleged phenomena. Most of those who agreed to serve on the committee did so in the determination to unmask what they believed to be an imposture. The committee met on forty occasions, and the report which they finally presented caused amazement and dismay among the Dialectical Society, who refused point-blank to publish it. The committee, fortunately, were spirited enough to publish the report at their own expense, though it was the exact opposite from that for which they had confidently hoped. The report concludes with the following observation:

"In presenting their Report, your Committee, taking into consideration the high character and great intelligence of many of the witnesses to the more extraordinary facts, the extent to which their testimony is supported by the reports of the sub-committees, and the absence of any proof of imposture or delusion as regards a large portion of the phenomena . . . deem it incumbent upon them to state their conviction that the subject is worthy of more serious attention and careful investigation than it has hitherto received."

Here are some extracts from the Report:

"Thirteen witnesses state that they have seen heavy bodies—in some instances men—rise slowly in the air and remain there for some time without visible or tangible support."

"Five witnesses state that they have seen red-hot coals applied to the hands or heads of several persons without producing pain or scorching, and three witnesses state that they have had the same experiment made upon themselves with the like immunity."

Huxley was invited by the Dialectical Society to join their Committee, and he replied, much as a Cardinal might reply if he was invited to examine the case for Anglo-Israelism:

“I regret that I am unable to accept the invitation of the Committee of the Dialectical Society to co-operate with a committee for the investigation of ‘Spiritualism’; and for two reasons. In the first place, I have not time for such an inquiry, which would involve much trouble and (unless it were unlike all inquiries of that kind I have known) much annoyance. In the second place, I take no interest in the subject. The only case of ‘Spiritualism’ I have had the opportunity of examining into myself, was as gross an imposture as ever came under my notice. But supposing the phenomena to be genuine—they do not interest me. If anybody would endow me with the faculty of listening to the chatter of old women and curates in the nearest cathedral town, I should decline the privilege, having better things to do. And if the folk in the spiritual world do not talk more wisely and sensibly than their friends report them to do, I put them in the same category. The only good that I can see in the demonstration of the truth of ‘Spiritualism’ is to furnish an additional argument against suicide. Better live a crossing-sweeper than die and be made to talk twaddle by a ‘medium’ hired at a guinea a séance.”

Huxley failed to realise that the question at issue was not whether the life of a crossing-sweeper was richer and more varied than the life of a spirit, but whether the fact of spirit communications had been proved. The spiritualist might well have rejoined, “Sit down before fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses Nature shall lead . . . even to the abyss of the spiritualistic heaven.”

“The odd point,” as William James so justly remarks, “is that so few of those who talk in this way realise that

they and the spiritists are using the same major premise and differing only in the minor. The major premise is: 'Any spirit-revelation must be romantic.' The minor of the spiritist is: 'This *is* romantic'; that of the Huxleyan is: 'This is dingy twaddle,' whence their opposite conclusions!"

It is, moreover, quite possible to believe in the genuineness of Home's mediumship without accepting the spiritualistic explanation, and without resigning oneself to passing eternity in a spiritualistic heaven.

To the scientist no fact should appear common or unclean. Snobbery has no place in science, and it is pure snobbery to decree that the undignified and trivial phenomena of spiritualism are unworthy of patient investigation.

It was left to scientists like Sir William Crookes and Sir Oliver Lodge to practise what Huxley preached, to apply to psychical research those same high ideals which guided Huxley in biological research.

Sir Oliver Lodge has drawn an apt comparison between theological and scientific obscurantism. He writes as follows:

"It is singular and perhaps depressing that the obscurantist attitude of theologians in the past has been so amply imitated by the pontiffs and high priests of science in the recent present. They still oppose their admirable theories and great knowledge of the universe to resist the incursion of fresh information; they oppose observed facts on a priori and utterly inadequate grounds. No one ought to consider his knowledge of the universe so complete and final as to be competent to negative careful testimony based on critical and responsible experiment and observation, especially if the observer has already proved his competence in more recognised branches of knowledge. Explanatory hypotheses may be criticised severely, but the facts demand attention."

It is easier to condone Huxley's reaction to spiritualism

than to forgive his failure to realise the importance of Samuel Butler's criticism of the Darwinian hypothesis. Butler's books were full of facts. Did Huxley sit down before those facts as a little child? Butler to-day is receiving from the scientific world that tardy recognition which was denied to him by his contemporaries. He attacked not only Darwinism, but Huxley's more extreme deductions from the Victorian heresy. Huxley never deigned to reply. Butler's name does not even occur in the index to the *Life of Huxley*.

Huxley liked to describe himself as Darwin's bulldog. He enjoyed fastening his teeth in episcopal gaiters, and it was a pity that he shrank from accepting Butler's challenge, a challenge far more formidable than that of Bishop Wilberforce.

Many years ago a brilliant but heretical scientist, who was regarded with deep suspicion by the scientific pundits of the day, relieved his feelings in a letter to a friend:

"Oh, my dear Kepler, how I wish that we could have one hearty laugh together! Here at Padua is the principal professor of philosophy, whom I have repeatedly and urgently requested to look at the moon and planets through my glass, which he pertinaciously refuses to do. Why are you not here? What shouts of laughter we would have at his glorious folly."

We join in the laughter, and yet a disquieting parallel suggests itself—Professor Huxley refusing to look through the telescope lest he might see the new planet of psychical research which had just swum into the scientific hemisphere; Professor Huxley refusing to glance through the microscope which had enabled Samuel Butler to detect the flaws in the Darwinian hypothesis.

"Sit down before fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses nature leads, or you shall learn nothing."

This humble following of fact led Huxley to no abysses.

On the contrary, it conducted him gently to the Presidency of the Royal Society, to a Privy Councillorship, and to a pension from a grateful nation.

Sit down before fact. By all means, but remember that all facts must be taken into consideration. Do not repeat Huxley's mistake. Do not dismiss as irrelevant the fact which cannot be measured in your laboratories. Do not forget *qualitas* in your search for *quantitas*.

The most important fact about music is that science cannot begin to explain why music affects us as it does. Acoustics can only explain the mechanics of sound.

"Such gifts be allowed to man
That out of three sounds he frame, not a fourth sound but a star!"

Acoustics can explain the "three sounds," but not the star. The star is an extra, a free gift, an emergent something which is not implicit in the "three sounds."

Again, from granite, ice and snow, all of which are describable in terms of science, there emerges "not a fourth sound but a star," something which Wordsworth detected behind the lakeland hills,

"A sense sublime
Of something far more deeply interfused
Whose dwelling is the light of setting suns
And the round ocean and the living air
And the blue sky and in the mind of man."

Poets indeed are in touch, not with illusion, but with realities which escape the coarse measuring instruments of the scientist. A geological hammer is a useful tool which helps us to learn a few relatively unimportant facts about the mountains; Wordsworth's tool is the finer and the more accurate.

Most of us have known moments, it may be among the mountains or by quiet waters or in woods at dawn or on the open sea, when we know beyond all need of proof that the veil has been drawn aside, and that the barrier between the things which are seen and the things which are unseen has been lowered for an instant.

"Such harmony is in immortal souls,
But whilst the muddy vesture of decay
Doth grossly close it in, we cannot hear it."

But among the hills we wear our muddy vesture with a difference and catch the distant note of immortal harmony.

Science may have no measuring appliances which can record the reaction of the mind to a sunrise among the hills, but the moments which "reveal to us the poetry of existence" are no less real than the facts of which science takes cognisance.

"We do not ask," continues Sir Arthur Eddington, "whether philosophy can justify such an outlook on Nature. Rather our system of philosophy itself is on trial; it must stand or fall according as it is broad enough to find room for all experience as an element of life. The sense of values within us recognises that this is a test to be passed: it is as essential that our philosophy should survive this test as that it should survive the experimental tests applied by science."

A man who was guided in his study of religious problems by the principles which Huxley so admirably defined would "sit down humbly" before a variety of facts which Huxley ignored.

He would not handicap himself at the outset by any specific dogma on the nature of God or as to the non-existence of God. He would be prepared to admit the daring possibility that creation may be the work of a Creator, and he would further be prepared to concede the possibility that this hypothetical Creator might, if He chose, change the action of his own laws.

There is no a priori reason why miracles should not occur. The question of miracles is purely a question of evidence.

The man who rules out miracles as impossible on a priori grounds inevitably commits a series of crimes against logic. This is the sort of reasoning, if you can

dignify it by that name, which is common in free-thinking literature, an argument which can be summarised as follows:

Miracles do not occur. Therefore those who report miracles are superstitious. We can reject their testimony because they are superstitious, and we can describe them as superstitious because we reject their testimony. An age which accepts miracles is superstitious, and an age which is superstitious accepts miracles.

Listen, for instance, to Mr. Joad on the Resurrection. "The evidence for the Resurrection consists of a disputable inference from extremely uncircumstantial references to a supernatural occurrence made by unknown writers in a grossly superstitious age."

I have heard of circumstantial evidence, but Mr. Joad alone knows what he means by "uncircumstantial reference," and perhaps, Mr. Joad could tell us why he considers the first century A.D. more superstitious than our own age.

The chain letter, for instance, is a modern invention. A half-witted officer, suffering, no doubt, from war strain, sent out a message to nine people who were assured that ill fortune would dog them for ever if they did not, in turn, copy out this message and send it to nine other people.

Since when, a great number of people have been engaged in copying out and circulating this inane document. Thousands of people must have believed that ill-luck might dog their lives if they broke the chain. They accepted a highly improbable statement on the authority of the individual half-wit who started this chain. Of those thousands, the great majority probably feel intellectually superior to the average Catholic who accepts a statement infinitely less improbable—on the authority, not of an individual, but of a Church with nearly two thousand years of history behind it.

Drive down Piccadilly and you will see mascots on every second car. Walk into a bridge club, and you will

find enlightened modern man racing round the tables in search of winning seats or muttering after he has bungled a good hand, “The cards never forgive.” If you wish to compare our own with that grossly superstitious age in which Christ lived, turn to Cicero and read his calm, sceptical discussion of the value of divination and oracles. I do not think that Cicero would have helped to circulate a letter chain or would have adorned his chariot with a mascot.

These lazy generalizations about past ages will not appeal to the inductive inquirer.

He will examine, not only the evidence for the Resurrection, but also for such well-attested miracles as the Stigmata of St. Francis, and to come to modern times, for the strange happenings reported from Lourdes. Before dogmatising on the subject of modern miracles he will, at least, read standard works on the subject, such as Jorgensen's *Lourdes*.

But miracles are not the only, or indeed the most important evidence for the supernatural. The inductive inquirer cannot afford to neglect the evidence of religious experience, and in particular of mystical experience. He will note the curious similarity of mystical experiences separated by barriers of time and distance. Mystics of different races and of different centuries all appear to be describing an identical experience. They corroborate each other in surprising fashion. This is a fact of which the true scientist will take count. He will not dismiss on a priori grounds these experiences as illusory.

Again, the scientific inquirer will examine with interest the phenomena of conversion.

Nothing is easier than to evoke a fleeting condition of religious exaltation. Nothing, on the other hand, is more difficult than permanently to transform character, for character, like personality, is intensely conservative.

Consider, for instance, the Evangelical Revival of the eighteenth century. The historians are agreed that the Evangelical Revival produced permanent results, and that

its influence on the health and sanity of English life was beneficial.

Read *Wesley's Journal* and you will find instance after instance of men whose lives had been permanently changed by that Revival. Facts are stubborn things, whether they be the facts of chemistry or the facts of conversion. To dismiss an inconvenient fact because it does not fit into your system, is unscientific, whether that fact be a fossil in the rocks, or a change of heart and of life. The inductive reasoner will take account of the facts of conversion. He will not be impressed by the impatient deductive generalizations with which that conscientious agnostic Leslie Stephen attempted to explain away these facts of conversion. "What, they seem to have tacitly inquired," wrote Leslie Stephen, "is the argument which will induce an ignorant miner or a small tradesman in a country town to give up drinking and cock-fighting? The obvious answer was: Tell him he is going straight to hell-fire to be tortured for all eternity. Preach that consoling truth to him long enough, and he may be thrown into a fit of excitement that may form a crisis in his life."

The inductive reasoner will ask whether, in point of fact, the fear of hell-fire has proved capable of effecting permanent changes in character. He will go to history and he will discover that throughout the Middle Ages the horrors of hell formed the staple topic of medieval sermons, but that there were few cases of men being thrown into fits of excitement by medieval sermons, and still fewer cases of such fits proving an important crisis in their lives.

Had Leslie Stephen checked his unscientific theory by facts he would have discovered that Wesley preached only one sermon on Hell, whereas he preached rather more than forty thousand times on his favourite theme, the Love of God freely offered to all mankind. It was indeed, his invariable custom to select for his sermons what he himself called "comfortable words."

John Wesley was, in many ways, a characteristic product of an age that distrusted emotion and that worshipped reason. The emotional symptoms of conversion did not impress him, but he was rational enough to be impressed by the permanent results. “Let any judge of it as they please. But that such a change was then wrought appears not from their shedding tears only, or sighing, or singing psalms, as your poor correspondent did by the woman of Oxford, but from the whole tenor of their life, till then in many ways wicked; from that time holy, just, and good.

“Saw you him that was a lion till then and is now a lamb; he that was a drunkard, but now exemplarily sober; the whoremonger that was, that now abhors the very lusts of the flesh? These are my living arguments for what I assert, that God now, as aforetime, gives remission of sins and the gift of the Holy Ghost, which may be called visions.”

It is difficult to understand why materialists, who believe that everything can be translated into terms of force, should forget their dynamics in the discussion of religious forces. Conversion is a very striking example of the neutralisation of force. If a motor-car passes you at a speed of sixty miles an hour and stops within fifty yards, you know that the force which impels the motor-car has been neutralised by another force. Now the sex impulse is a force as potent in its way as the force which drives a car. If we find example after example of the neutralisation of that force—“the whoremonger that was, that now abhors the very lusts of the flesh”—it is incumbent on us as scientific inquirers to search for the neutralising force. If we cannot discover it, at least let us admit our ignorance instead of talking nonsense about hallucination, auto-suggestion, etc. It would be as reasonable to suggest that the motor-car is stopped at full speed by auto-suggestion.

One fact emerges beyond dispute from the personal documents of religion, the fact that prayer helps to neutralise the sex impulse.

Forget, for the moment, all question of sin and morality, consider sex in its impersonal form analogous to the other great forces of Nature. Investigate this problem on strictly scientific lines, and you will find it difficult to dispense with a supernatural factor in your final solution.

"The dynamics of chastity" is a promising theme for scientific research, but I fear that a thesis on this subject would hardly be acceptable as a thesis for a doctorate of science.

Scientists suffer from an inhibition against any form of scientific research the result of which might be exploited in a tract. Professor Julian Huxley, for instance, has done useful research work on the determination of sex, but he would be dreadfully embarrassed if he was asked to write a treatise on Sex in Relation to Prayer. And yet, some such thesis might throw a little light on problems of far greater and more general interest than those which concern the loves of frogs or the passionate wooing of wasps.

Torture provides an even more striking illustration of the neutralisation of forces, for pain is the strongest of all immaterial forces, and few indeed are those who can remain unaffected by extreme pain. We have a greatly exaggerated conception of the power of medieval man to resist torture. The overwhelming majority of those who were tortured confessed to the sins of which they were accused, recanted their beliefs, betrayed their friends or insured by any other means in their power remission of pain. The greatest of medieval orders, the lay Order of Templars, was destroyed by torture. Their enemies were determined to prove that the Order was guilty of obscene rites in order to confiscate their property. The charge was ridiculous, but the Templars who were tortured supplied all the evidence that was required and betrayed the great Order, of whose membership they had been so proud and whose interests they had vowed to serve. In England, where no torture was employed, no evidence was obtained.

The records of the Inquisition, patiently and methodically sifted by the American historian, Lea, proved that

torture seldom failed to extract the admissions required by the Inquisitors.

And yet, religious anaesthesia was fairly common in connection with religious martyrdom.

The blood of the martyrs was the seed of the Church, not merely because the martyrs were prepared to die for their faith—there was nothing particularly remarkable in that—but because the martyrs appeared to derive exquisite enjoyment from the process of dying. Nero thought that it was a good joke to light up the Roman gardens with living torches, and apparently the Christians shared the joke, for these amazing men radiated happiness from the flames.

Seneca had seen men die bravely. He had seen men stand torture, but he had never seen men enjoy being tortured. The sentiments which Seneca expressed in a letter which has since become famous, were very generally shared by the Roman populace.

The martyrs were horribly impressive—there was no getting away from that fact. Many of those who watched them die were convinced, at first very unwillingly, that these amazing men had some external source of strength. They had access to a force which neutralised the sharp force of pain.

Tertullian, a lawyer in Carthage, began by despising the Christians, but he was shaken when he witnessed their firmness. Their courage was a kind of reproach to the men who saw them die. It was, perhaps, not unnatural that people should try to belittle their heroism. It was not really courage—it was merely *obstinatio*. "*Illa ipsa obstinatio quam exprobatis*"—"That obstinacy which you condemn."

Tertullian found it rather difficult to condemn this obstinacy. He was struck with some misgiving (*scrupulo*) on witnessing their superhuman endurance. He sat down before the fact of their endurance, that tremendous fact, "like a little child"—"*et ubi cognoverit veritatem, ipse statim sequitur.*"

"Every man beholding this great endurance," he writes, "is struck with some misgiving, and set on fire to look into the matter, and when he has learnt the truth he instantly follows it as well."

"It would be hard," comments Professor Glover, "to put into a sentence so much history and so much character."

Scientists are never tired of emphasising the value of original research, and are always tempted to dismiss without consideration the views of a critic, however brilliant, if the critic in question, as was the case with Samuel Butler, has done no original research.

Certainly, if our object be to investigate the spiritual laws in the same spirit as the scientist investigates the physical laws of the universe, we must not only sift the evidence which is to be found in the personal documents of religious literature, but we must also check that evidence by data accumulated in the course of original research. The true scientist will study at first hand the phenomena associated with religious revival, and will do his best to conquer that very natural inhibition against the emotionalism so often associated with revivals. In many cases this inhibition may prove too strong, and the inquirer, in consequence, will have to be content to study the movement from outside. This has always been my difficulty. I am enormously interested in discussing these problems with revivalists and in comparing and contrasting their technique and their experiences with the technique and experiences of the great revivalists such as John Wesley. But I evade very skilfully invitations to study their movements from within. The still, small voice of my scientific conscience rebukes me for my failure, but the habits of a lifetime are not easily broken.

The true scientist who is unaffected by such tiresome inhibitions might profitably investigate the latest, and in some ways the most remarkable of modern Revivals.

"F.B.," the founder of this Movement, is described as

“F.B.” in the official story of the Movement by Mr. Harold Begbie.¹

“F.B.” is an American, and an ordained minister of an American Lutheran church. “In appearance,” writes Mr. Begbie, “he is a young-looking man of middle life, tall, upright, stoutish, clean-shaven, spectacled, with that mien of scrupulous, shampooed and almost medical cleanliness, or freshness, which is so characteristic of the hygienic American. His carriage and his gestures are distinguished by an invariable alertness. . . . He strikes one on a first meeting as a warm-hearted and very happy man, who can never know what it is to be either physically tired or mentally bored. I am tempted to think that if Mr. Pickwick had given birth to a son, and that son had emigrated in boyhood to America, he would have been not unlike this amiable and friendly surgeon of souls.”

“F.B.” keeps in the background. He never addresses monster meetings, he avoids publicity, and he makes no appeal for funds. On the only occasion on which I met “F.B.” I asked him how he financed the sending of missionary groups during the Long Vacation from Oxford to South Africa. “I never ask for money,” he replied, “either in print or in any other way. I don’t bother about finance, but as you ask a definite question, I will try and answer it. The money we need turns up somehow. For instance, we had booked our passages to South Africa, but there was no money to pay for our passages until twenty-four hours before the ship sailed. Then it came in as a spontaneous gift.”

He gave me other odd instances of what he chose to describe as “answers to prayer.”

An anonymous writer contributes an interesting personal narrative to Mr. Begbie’s book. The writer in question was an Oxford man of twenty-four, “regarded by many good judges as a scholar who may, quite possibly, make a valuable contribution to philosophy.” The scholar in question appears to have been a characteristic Greats man,

¹ *Life Changers.* (Mills & Boon.)

cynical and sophisticated. He quotes an illuminating remark by a German. "You English," he said, "are always at the mercy of your '*Aesthetic Conscience*.' You have an instinctive reaction against some forms of behaviour which seem out of place, vulgar, theatrical. This *Aesthetic Conscience* is right ninety-nine times out of a hundred; in the hundredth case it will prevent you from helping or appreciating a man whose constitution or education are radically different from your own." And the Oxford Greats man continues: "My *Aesthetic Conscience* had a hard time of it with the Americans. . . . I felt myself in an alien culture."

The Americans in question were friends and disciples of "F.B." whom our Greats man had been invited to meet.

And yet, at their first meeting the Greats man had surrendered completely. "I have dwelt on this first meeting rather because of its immediate strangeness than because of its results. For the first time in my life I had deliberately and gladly made a fool of myself before a perfect stranger. I had told him things I had never breathed to another; I had told him of all my laughable vanities and dishonesties that make the stuff of a man's most intimate life."

All "F.B.'s" groups are pledged not only to live the religious life, but to devote their energies to an aggressive missionary campaign. Our poor Greats man, in spite of the twinges of his *Aesthetic Conscience*, was persuaded to do his bit in this direction. And there is no greater evidence of "F.B.'s" influence than his success in persuading people, like this Greats man, to seek out the unregenerate undergraduates and to entice them to prayer meetings organised by an American minister of a Lutheran church. It would be easier to understand "F.B.'s" influence if he was a second Newman speaking the same language as his disciples, and a product of the same tradition. But this is not the case. "Some of these men spoke to me with troubled criticism of their leader, disliking some of his pet phrases, disapproving as vigorously as I did of his theological opinions, but all sticking to him with an unconquerable loyalty as the man who had worked a great

miracle in their lives, and who was by far the most remarkable man of their experience in spite of everything that troubled either their taste or their judgment."

In South Africa these Oxford groups have been remarkably successful in mitigating racial antagonism. The following is a quotation from an open letter which appeared in the leading weekly paper in Cape Town.

"Dear General Hertzog,—I have so often had occasion to criticise you in the past that I gladly embrace this opportunity of warmly congratulating you on your recent pronouncement on the subject of republicanism and secession. In my opinion it is one of the finest things you have ever done in the whole of your political career. . . . It was an act that called for courage, since it was tantamount to a stern rebuke of the extremist members of your party. . . . If it were not that it might sound like sentimentality or cynicism I would go so far as to say that you have been affected in Bloemfontein during the last few weeks by the benign influence of the Oxford Group, and that you have been inspired to this great gesture of goodwill by the spirit of tolerance, kindness and humanity that these religious crusaders seek to instil. . . ."¹

I have tried in this chapter to indicate some of the facts which a scientific inquirer would consider before forming any opinion on the validity of religious experience. But the accumulation of facts takes time, and the sifting of evidence is often tedious, and the modern intellectual usually prefers a short cut to the solution of this particular problem. Professor Julian Huxley, for instance, in his book, *Religion without Revelation*, after dismissing a personal God as the mere product of the human imagination, proceeds to describe the ideal religious service of the future. He advocates a form of public service which "will provide some opportunity for a communal proclaiming of belief in certain spiritual values; for refreshment of the

¹ *A Modern Oxford Movement*, by the Rev. W. J. Margetson, Provost of St. Mary's Cathedral, Edinburgh.

spirit through that meditation guided by pure desires which alone deserves the name of prayer . . . expressing in music or liturgy various natural religious emotions of praise, contrition, awe, aspiration, which otherwise would remain without natural outlet. . . . On the other hand, the set service could be reduced, the old-fashioned sermon be more and more replaced by an address or lecture or by the reading of some good book."

But this is pure apriorism. An empiricist would first go to history to discover whether religion without revelation had ever worked in practice, and he would find that the Positivist had made an heroic, but utterly futile attempt to retain Catholic ritual while rejecting Catholic doctrine.

And from the complete failure of Positivism we are entitled to assume that the most attractive of ceremonial will not entice people to church merely to hear "honesty is the best policy" set to music and sung as an anthem.

It would, perhaps, be unkind to remind Julian Huxley of his grandfather's verdict on Religion without Revelation. "Of all sickening humbugs in the world," wrote Thomas Huxley, "the sham pietism of the Positivist is to me the most offensive."

If Julian Huxley cares to pay a visit to the Ethical Church he will, I believe, agree that there is no real future for "sham pietism." The type of service which he describes in his book can be enjoyed at the present moment at the Ethical Church. A cultured gentleman arrayed in a surplice reads lessons from Wordsworth or Blake. The worshippers are provided with ethical prayers. The "Lord's Prayer" is re-written "Forgive us our trespasses all ye our fellow-men," and the vulgar hymns about the Blood of Jesus are replaced by hymns to humanity. It is all extremely refined, and the congregation numbers some thirty highbrows.

True religions grow. They cannot be manufactured. If Julian Huxley had studied the laws which govern the growth of religion he would have discovered that religion unbacked by revelation enjoys no more success than bank-

notes unbacked by bullion. "Ethics" will never fill a church. Religions flourish not in inverse proportions, but in direct ratio to their insistence on the supernatural. The man who says, "I know," will always fill a church. The man who says, "I am inclined to think," will preach to empty pews.

This does not mean that the dogmatists are right, but it does suggest that Julian Huxley is wasting his time trying to convert the world to religion without revelation. And I hope that he may yet find leisure to sit down as a little child before the great facts of religious experience, facts whose significance can only be ignored by the impenitent apriorist.

CHAPTER XVI

MISSING LINKS

I

THE Victorian scientist enjoyed sermonising, and one of his favourite texts was the immorality of any belief which was not based on overwhelming evidence. I have already quoted Professor Clifford's pious conviction that it was "wrong always, everywhere and for everyone to believe anything on insufficient evidence." Huxley again, in his *Lay Sermons*—a characteristic title—sermonises on the same theme. "The scientist, unlike the theologian," he tells us, "is compelled to demand that rational ground for belief without which to the man of science, assent is merely an immoral pretence."

Elsewhere, Huxley informs his readers, or perhaps we should say his congregation, that "an assertion which outstrips the evidence is not only a blunder but a crime."

Judged by this severe test, every ardent Darwinian was a criminal, nor could Huxley himself hope to escape a criminal prosecution for his writings are full of assertions "which outstrip the evidence." A few examples will suffice.

"None but parsons believe in chance." It would be paying this fatuous remark an undeserved compliment to describe it as "an assertion which outstripped the evidence." Again, consider the following:

"The great struggle between the determinist and the indeterminist, between the opponent and the sustainer of the freedom of the will, has ended to-day after more than two thousand years, completely in favour of the determinist. The human will has no more freedom than that of the higher animals, from which it differs only in degree, not in kind."

This short passage contains no less than five violent assumptions masquerading as facts, an over-generous allowance even for a Victorian scientist.

Huxley assumes (1) that the struggle between the determinists and the indeterminists has "ended to-day," (2) that it has ended completely in favour of the determinists, (3) that the human will has no more freedom than that of the higher animals, (4) that the human will differs only in degree from that of the higher animals, (5) that animals do not possess free will.

Of these assumptions even the last, which is implied but not explicitly stated, is not amenable to scientific proof or scientific disproof. The arguments for and against the freedom of the will are philosophic, not scientific. The struggle between the determinist and the indeterminist has not "ended to-day." It will probably last as long as the world lasts.

Huxley, like many other people, was most inclined to dogmatise where he was least entitled to dogmatise. As a scientist he was far from dogmatic and showed a commendable reserve as far as Darwinism was concerned, but he showed no such caution in his excursions into philosophy.

Even in the scientific field Huxley was sometimes guilty of assertions which outstripped the evidence. On one occasion he came to the conclusion that he had discovered in dredgings from the deep sea a substance which he believed to be the simplest form of life. He called this substance *Bathybius Haeckelii*. He did not say "I have reason to believe that this is a living substance." No, he was certain that he had discovered a low form of life, and he proceeded to name it just as one might name a new bird or fish. Unfortunately, the living substance turned out to be a chemical compound accidentally formed. Huxley was convicted of having made in the most positive fashion an assertion which outstripped the evidence. *Bathybius Haeckelii* was as dead as Haeckelism is to-day.

The literature of evolution abounds in "assertions which outstrip the evidence." The theory of genetic evolution,¹ which is certainly a good working hypothesis, is habitually referred to as if it was an established fact, nay more, as if there was such a thing as a "law of evolution" from which other facts could be deduced.

In the nature of things, the theory of evolution must rest on indirect evidence, and our verdict on that evidence will, of course, be largely affected by our theological prejudices.

In other words, the objective facts which suggest evolution are tolerant of many interpretations, among which our ultimate choice will be determined very largely by theological or atheistic bias.

Philip Goss, for instance, as readers of *Father and Son* will remember, was an enthusiastic Plymouth Brother, and a no less enthusiastic naturalist. His book, *Omphalos*, is an ingenious attempt to explain away the apparent evidence of fossils, and to reconcile the existence of these fossils with the doctrine of his sect, according to which the world was created during the last few thousand years.

Almighty God, according to Philip Goss, had created the world just as it is, fossils and all complete. The world was created in seven days about four thousand years before the birth of Christ. As the world and the fossils were created together, the world instantly presented the structural appearance of a planet on which life had existed for millions of years.

We cannot refute this theory by scientific inductions from facts. We reject it with confidence on a priori grounds, for it is, as Charles Kingsley said, "unthinkable that God had written on the rocks one enormous and superfluous lie."

The theory that the separate species were created sepa-

¹ I have already explained that by "genetic evolution" is meant evolution by descent.

rately by God, a doctrine which the Victorian scientists viewed with quite peculiar abhorrence, cannot, however, be rejected on a priori grounds. None the less, we can sympathise and even applaud the reluctance of the scientists to admit special creation. It is the duty of the scientist to search for natural explanations of phenomena. "Not to fall back on the gods," as William James once remarked, "when a proximate principle may be found, has with us Westerners since become the sign of an efficient, as distinguished from an inefficient, intellect."

The scientist instinctively feels that the answer "God made them separately" is a lazy answer, even if it should be proved correct, to the question, "How did the different species arise?"

None the less, it is difficult to see why an omnipotent Creator should not, on a priori grounds, be free to adopt any one of the following alternatives:

1. He might have created the primeval cell with the potentiality to evolve into all the existing species of the world.

2. The act of direct creation might have been confined to the moment at which the world was created, but at that moment a number of different species might have been created with the power to evolve into other species and thus to add to the limited number of existing species originally created.

This would be a case of separate, but at least, simultaneous creation.

3. God might have intervened by a creative act at distinct periods in the world's history (separate and successive creation). Wallace, the co-formulator with Darwin in his theory of Natural Selection, was inclined to believe that there were "three stages in the development of the organic world when some new cause or power must necessarily have come into action," the first when the first living cell was created, the second when the animal kingdom separated from the vegetable kingdom, and the third at the creation of Man.

4. God might have created by separate acts of creation the different species.

There are no a priori reasons which would enable us to arrange this series of possibilities in a scale of plausibility. On æsthetic grounds the first theory is certainly the most, and the fourth theory the least attractive for the simple solution is æsthetically more attractive than the complicated. The scientist who is influenced by æsthetic considerations will be attracted by the theory that evolution is monophyletic rather than polyphyletic, or in other words, that life evolved from a single primeval cell rather than on different lines of descent from different sources, but this view is dictated, not by scientific reasons, but by æsthetic prejudice.

All scientists are agreed that no life could exist on the surface of our planet at the very beginning of our planet's history. Consequently life must have appeared on the surface of the earth at a particular moment in time. But there is no reason why the conditions which produced life should not have recurred again and again. Æsthetic prejudice rather than scientific evidence weights the scale in favour of monophyletic evolution and against special creation.

Nobody denies the procession of life from simple to more complicated forms. Few things are more certain than that the simpler forms of life were the first to appear on the surface of the globe, that fishes, for instance, were in existence long before Man appeared.

But, as explained in the previous chapter, succession does not necessarily imply descent. The evolution of the fleet in Nelson's day to our own represents a process of evolution by means of separate creation. Each new addition to the fleet represents the result of separate creative effort on the part of Man. The modern Ironclad is not descended genetically from Nelson's *Victory*.

The question at issue, therefore, is whether Man, like the modern Dreadnought, is the product of a separate creative act, or whether Man is descended from some fish-like ancestor.

The Procession of life is certain, for Man undoubtedly appeared on the surface of the globe at a later stage than fishes. But is genetic evolution (that is evolution by descent) equally certain?

III

The main lines of evidence for genetic evolution may be briefly summarised as follows:

(1) *Recapitulation.* The striking resemblance between the embryos of different types in the same group are suggestive of genetic evolution. In the early stages, the embryos of reptiles and mammals are very similar, as if these embryos were destined to travel along the same path for some distance before diverging. According to this theory the development of the individual recapitulates the development of the race. The individual, to quote a famous epigram, "climbs up its own genealogical tree."

The human embryo, for instance, begins as a single cell, thus recapitulating the protozoan stage. At a slightly later stage gill-clefts appear, a reminiscence of his fishy past; the embryo when about a month old shows signs of a tail, and even after birth the human baby recapitulates its arboreal past by proving, when required, that it can support itself by its hands alone. A baby ape also possesses this faculty.

These facts strongly suggest, but they are far from demonstrating evolution.

Kellogg, for instance, who is a firm believer in genetic evolution, remarked that the recapitulation theory of Fritz Müller and Haeckel is chiefly conspicuous now as a skeleton on which to hang innumerable exceptions.

Again, Professor Patrick Geddes and Professor J. Arthur Thomson, who in collaboration produced *The Evolution of Sex and Evolution*, write as follows:

"It must also be frankly stated that we are apt to get into a vicious circle in arguing about recapitulation. We infer the pedigree from development, and then say that the development recapitulates the pedigree. But this is not

quite so bad as it seems, since no racial history or phylogeny is worth considering for a moment that does not show the anatomical affiliation of actual forms, whether living or fossil, and embryological investigation cannot do more than suggest clues. Again, we consider the circuitousness of the frog's life-history and find in it an evidence of the reality of recapitulation. We say that in the development of many of its organs the frog repeats steps which were taken by the fish stock from which the race of Amphibians sprang. We then use this as one of "the evidences of evolution" which we have already assumed. But the fallacy here is simply that we cannot directly demonstrate the truth of the doctrine of descent; we can only bring forward facts which suggest it, and it serves to interpret."

(2) The examples of rudimentary and vestigial organs which are alleged to be of no advantage to their possessors are explained by the evolutionists on the hypothesis that these organs were useful to the remote ancestors of their present possessors, and that the changes of structure rendered them useless, as the result of which they dwindle away by disuse.

But surely it is unscientific to insist that an organ is useless merely because we do not understand its use. As Huxley himself remarked, "The recent discovery of the important part played by the 'thyroid gland' which was once supposed to be quite useless, should be a warning to speculators about useless organs."

(3) *Palaeontological Evidence.* The geological record undoubtedly bears witness to the regular procession of living things from lower to higher forms. This is indeed the one solid fact on which the theory of evolution rests. The doctrine of Genesis, however, records a similar progression from lower to higher forms of life, and in order to escape from the theory of special creation a believer in genetic evolution must attempt to prove that the higher forms are descended from the lower forms.

Now if genetic evolution takes place, as Darwin believed, by means of small changes from generation to

generation, we should expect to find some fossils of intermediate forms between one type and another. Unfortunately, the geological record is entirely in favour of fixed type. Birds are, for instance, supposed to have evolved from reptiles, or at least from an ancestor of the reptile type. But we search in vain among the rocks for any fossil records of a reptile in the process of growing a wing. Geology shows us reptiles without wings, and birds provided with perfectly developed wings. There is a sudden jump from no wings to wings, as if the problem of flight had been solved overnight. Where are the rudimentary wings, the experimental wings, the wings which just lifted their possessors a few inches from the ground, or which just enabled their possessors to plane from one tree branch to another?

The archeopteryx, that most ancient of fowls, has certain reptilian characters, but its wing is completely developed. "The feet," as Huxley pointed out, "are not only altogether birdlike but of the special character of the feet of perching birds; while the body had a clothing of true feathers."

Professor Poulton tells an amusing story of the meeting of the British Association at which the archeopteryx was introduced into scientific society. As the lecturer proceeded to enlarge on the reptilian characteristics of this venerable bird, Dr. Wright, a staunch anti-evolutionist, could be heard muttering savagely, "Archeopteryx is a very good bird."

In point of fact, though the archeopteryx might fairly be described as a very good bird with certain reptilian characteristics, we have yet to find the fossil of a reptile with a rudiment of a birdlike wing.

On this point the modern evolutionists will perhaps protest that whereas the absence of transitional forms in the geological record is a strong argument against the Darwinian theory of evolution by means of the slow accumulation of minute modifications, it is no argument against genetic evolution by mutation.

Perhaps not, but it is no more difficult to believe in special creation than in a mutation which solves the problem of flight by providing a completely developed wing in one jump. If we are to accept such a violent mutation, we might as well take our evolution from Genesis and have done with it. On the other hand, if we insist on comparatively small mutations, we have a right to ask from the geological record some evidence of half wings and quarter wings.

Darwin attempted to explain away the absence of transitional forms by the fact that the geological record was, in effect, "a history of the world imperfectly kept, and written in a changing dialect; of this history we possess the last volume alone, relating only to two or three countries. Of this volume, only here and there a short chapter has been preserved; and of each page, only here and there a few lines."

It is, however, singularly unfortunate that, as Monsieur Quatrefages remarks, "so many of the facts which tell against the evolutionary theory should have been preserved in the scraps of Nature's great book which remain to us, and that invariably those which would have told in its favour were recorded in lost volumes and missing leaves."

It is easy to imagine what would be said of a theologian who supported a particular doctrine by an appeal to the sayings of Christ of which no record has been kept. Fortunately for theology it is unnecessary for a theologian to appeal to the imperfections of the gospel record.

Moreover, the whole case for evolution rests on the assumption that the geological record is reasonably reliable. Unless we can feel confident that fishes appeared before reptiles, and reptiles before birds, there is no case whatever for evolution, but our confidence is only justified by the assumption that the geological record is relatively reliable, for if that record is so imperfect as to be unreliable, we have no grounds for believing that fossils of reptiles may not yet be discovered in some strata dating

from the Silurian period, and fossils of birds from some strata of the Devonian Age.

It is a little naïve for the Darwinian to assume, as he does, that the missing volumes of Nature's book would supply all the evidence which he requires, and no evidence which could possibly tell against his theory.

If the transformation of species takes place by the accumulation of very slow gradual changes, there must have been a vast number of transitional forms between the different types, between, say, the reptile and the bird. Consequently, however imperfect the geological record may be, we have every right to expect a larger number of fossils of the transitional type than of fossils which are definitely reptilian or definitely avian.

It is utterly contrary to the mathematical laws of chances that we should find, as we do, an overwhelming number of fossils of the fixed reptilian type, and an overwhelming number of fossils of the fixed bird type, and only one fossil, *archeopteryx*, which could be described by the most sanguine of evolutionists as a missing link. Even *archeopteryx* is provided with a perfectly developed wing.

I have never seen any estimate of proportion between fossils so far discovered of reptiles and birds or the probable number of reptiles and birds which have existed, but will assume, for the sake of argument, that in prehistoric times only one bird or one reptile out of a hundred million survived in fossil form. Consequently, the geological record may be compared to a book of a hundred million pages of which one page survives. Even so, we should expect to find that that particular page would not consist entirely of records of definite reptiles or definite birds, but would also, on the mathematical law of chances, contain some reference to the vastly larger number of intermediate forms between reptiles and birds.

Huxley, who was a clearer thinker than Darwin, realised that "the imperfection of the geological record" was a far more serious difficulty than Darwin was prepared to admit.

"In answer to the question," Huxley wrote, "What does an impartial survey of the positively ascertained truths of palaeontology testify in relation to the common doctrines of progressive modification? . . . I reply: It negatives these doctrines, for it either shows us no evidence of such modification, or demonstrates such modification as has occurred to have been very slight; and as to the nature of that modification, it yields no evidence whatsoever that the earliest members of a long-existing group were more generalized in structure than the later ones."

Huxley, as we have seen, began by disbelieving in evolution, for he was impressed by the absence of transitional forms from the geological records. It is doubtful whether, apart from his anxiety to escape from the creation hypothesis, he would have been converted even by the pedigree of the Horse which was hailed as such a conclusive proof of evolution. "It is easy," he wrote "to accumulate probabilities—hard to make out some particular case in such a way that it will stand rigorous criticism. After much search, however, I think that such a case is to be made out in favour of the pedigree of the Horse."

Huxley was forced to admit in 1876 that the pedigree of the Horse, believed to have been established in 1870, already required radical revision. The Hipparrison, admitted as a direct ancestor in 1870, disappears from the line of direct ancestors in 1876, Anchithericum is displaced by Miohippus, etc.

Nor, indeed, did the trouble stop there. One critic discovered that Equus had been inconsiderate enough to appear in the rock record before some of his alleged ancestors, and once more the pedigree had to be reconstructed. The rather naïve assumption that the original series represented a single line of descent had to be abandoned. To quote again from *Evolution*, by Professor J. Arthur Thomson and Professor Patrick Geddes, they write: "In the enthusiasm of early discoveries the matter seemed simpler than it really is, and the mistake was made of hurriedly constructing a linear series which showed, for

instance, the gradual reduction of toes from five to one, and supposing that this was a genuine pedigree. More detailed and critical inquiry has shown, however, that there were several collateral series, and it is not quite justifiable to fill up gaps along one line by links which belong to other lines of descent."¹

I like the "*'quite'* justifiable." It would not be "*quite*" justifiable for me to prove that I was descended from Queen Victoria by filling up gaps along my own line of descent by a link which belonged to another line of descent.

The same authors quote Depéret, who writes as follows: "The supposed pedigree of the Equidæ is a deceitful delusion, which simply gives us the general process by which the tridactyl hoof of an Ungulate can transform itself, in various groups, into a monodactyl hoof, in view of an adaption for speed."

One more consideration. In order to prove that *Equus*, the modern horse, is descended from *Eohippus* you have got to prove *Equus* was not in existence at the time that *Eohippus* was roaming the plains. *Eohippus* may be an extinct type, and the modern horse may have been descended from a horse exactly similar to our friend *Equus*.

The evolutionist will, no doubt, reply that there is no record on the rocks of *Equus* until comparatively recent times, but I reply haughtily that the record I require will be found in those missing pages of Nature's book which bear witness to the existence of those transitional and intermediate forms which are required for the Darwinian hypothesis, and which are not mentioned in the few fragmentary pages which have survived. I do not see why the anti-evolutionist should be stopped from appealing to the "*imperfections of the geological record.*"

One word more. The transitional forms between *Eohippus* and *Equus* no doubt suggest that the horse has varied throughout the ages, *but it is one thing to prove that a species has changed into another species (reptiles into*

birds) and quite another matter to prove the evolution of a given species within the framework of definite limitations. A breeder by selecting exceptional character, can produce considerable variations, but no breeder has yet succeeded in producing a new species. Consequently, even if you could prove that the modern horse had evolved by descent from Eohippus, your difficulties would only be beginning. *The complete proof of genetic evolution requires evidence of the transformation of one species into another.*

The evolutionist is welcome to such consolation as he can derive from these nice little diagrams showing the evolution of the horse's hoof throughout the ages, but in his heart of hearts he knows that he would be only too glad to barter the pedigree of Equus, hoofs and all, for one single fossil specimen of "Pro-Aves," that hypothetical reptile with an embryo wing.

IV

The pedigree of the horse provides many examples of the confusion between conjecture and fact, but we do not finally leave the domain of science for poetic fiction until we reach our old friend Pithecanthropus. Pithecanthropus is the name given to a skull and some bones found in Java and which are assumed to be the remains of an ape-like ancestor. The subsequent career of these bones has been very happily summarised by Mr. Chesterton.

"The effect on popular science," writes Mr. Chesterton, "was to produce a complete and even complex figure, finished down to the last details of hair and habits. He was given a name as if he were an ordinary historical character. People talked of Pithecanthropus as of Pitt or Fox or Napoleon. Popular histories published portraits of him like the portraits of Charles the First and George the Fourth. A detailed drawing was reproduced, carefully shaded, to show that the very hairs of his head were all numbered. No uninformed person looking at its carefully lined face and wistful eyes would imagine for a moment

that this was the portrait of a thigh-bone; or of a few teeth and a fragment of a cranium."

All this, as Boule remarks, is so much "pithecanthropism."

But, at least, we have a cranium and a bone or two to justify the reconstruction of *pithecanthropus*, which is more than can be said of "Pro-Aves," the missing link between the bird and the reptile. *Archeopteryx*, the patriarch of birds, was, as we have seen, "a very good bird indeed", provided with a fully developed wing. Now the exigencies of the evolutionary theory demand a reptile with a rudimentary wing, and all that is necessary is to refer to the missing volumes in Nature's book for an exact description of the missing link in question.

It is difficult to suggest a mode by which a wing could be slowly and gradually evolved from a reptilian body. The accepted theory is that Pro-Aves lived in a tree and developed a habit of leaping from branch to branch. Mr. Pycraft, who is a very great authority on living birds, but perhaps not quite so reliable an authority on birds that have never lived, proceeds to tell us how Pro-Aves developed a wing:

"The use of the fore-limb for this work," e.g. leaping from branch to branch, "would naturally throw more work upon the inner digits, 1-3, so that the process of selection would rapidly tend to the increased development of these, and the gradual decrease of the two outer and now useless members. Correlated with this trend in the evolution, the axillary membrane, the skin between the inner border of the upper arm and the body, became drawn out into a fold, while a similar fold came to extend from the shoulder to the wrist, as the fore-limb, in adaptation to this new function, became more and more flexed."¹

And so Pro-Aves gradually changed his overlapping scales into something like the quills of a modern bird. Here at last, we have the rudimentary wing which we have hunted so long and so fruitlessly in the geological record,

¹ *A History of Birds*, by W. P. Pycraft (Methuen), page 38.

but which we find very accurately illustrated (page 39) in Mr. Pycraft's book.

As we read the careful and scholarly description of the "axillary membrane" which Pro-Aves possessed, and of the various stages during which a "similar fold came to extend from the shoulder to the wrist," and the final stages during which the scales "increased in length and also became fimbriated," it requires a real effort of the imagination to realise that Mr. Pycraft is describing an entirely imaginary creature of which neither bone nor feather nor fossil remnants are to be found in the geological record. The picture of Pro-Aves in his book is not labelled "Hypothetical reconstruction of a hypothetical reptile," but quite simply, as "One of the Pro-Aves."

"One of the . . ." I like that touch which suggests that the Pro-Aves depicted is only one of many whose fossils can be studied at the Victoria and Albert Museum.

Our scientists certainly do not lack imagination. Haeckel, for instance, is not content with one missing link. He provides man with a complete genealogy. The pedigree begins thus:

"1. Monera. 2. Single-celled Primeval animals. 3. Many-celled Primeval animals. 4. Ciliated planulae (*Planzeada*), and concludes with, 18. Semi-apes (*Prosimiae*). 19. Tailed narrow-nosed Apes. 20. Tail-less narrow-nosed Apes (Men-like Apes), etc."

The innocent reader, who has been educated to accept with simple faith the pronouncements of learned scientists, would never guess that this pedigree is pure fiction. He would be impressed by those wonderful Latin names, "Monera," "Promammalia," "Prosimiae," etc., and would be much surprised to learn that the creatures represented by these Latin names have left no traces in the geological record and exist only in Haeckel's imagination. Huxley reviewed the book in which this pedigree occurred, and according to Gerard, he made no comment whatever on this supreme example of assertions which "outstrip the evidence."

Family trees abound in evolutionary literature, and many of them are at least as fanciful as Haeckel's. "Far more eloquent than any amount of polemics," wrote Driesch, the great German biologist, "is the fact that vertebrates, for instance, have already been 'proved' to be descended from, firstly, the amphioxus; secondly, the annelids; thirdly, the *Sagitta* type of worms; fourthly, from spiders; fifthly, from *Limulus*, a group of crayfishes; and sixthly, from echinoderm larvæ. That is the extent of my acquaintance with the literature, with which I do not pretend to be specially familiar. Emil du Bois-Raymond said once that phylogeny of this sort is of about as much scientific value as are the pedigrees of the heroes of Homer, and I think we may fully endorse his opinion on this point."

V

The theologian, again, would not dare to model his apologetics on that parody of reasoning which enabled Darwin to bridge the gulf between the speechless ape and Man, endowed with the divine gift of speech.

"It does not," writes Darwin, "appear altogether incredible that some unusually wise ape-like animal should have thought of imitating the growl of a beast of prey, so as to indicate to his fellow-monkeys the nature of the expected danger. And this would have been a first step in the formation of a language."

Darwin was not alone in attempting to justify a scientific hypothesis by means of guesses "which do not appear altogether incredible." The mere fact that "Pro-Aves", *Pithecanthropus* and the rest of them "do not appear altogether incredible," is held to justify elaborate descriptions and accurate representations of these imaginary missing links.

Gerard again quotes Professor Whitney's remark about the "Pithecid" men. "There is no difficulty in supposing them to have possessed forms of speech, more rudimentary and imperfect than ours."

"There is no difficulty in supposing . . ." Of course not,

if you are a scientist. The mere theologian, however, would not permit himself to indulge in this pleasant game of "Let us suppose." He is expected, and is rightly expected, to advance evidence for his suppositions.

"Sit down before fact." Now what are the facts? Animals have been closely studied by mankind for many a long century, and we have yet to discover a wise ape-like animal capable of imitating the growl of a beast of prey. Why should these wise ape-like animals have disappeared entirely from the face of the globe? In the five thousand years of history, there is no record of an ape-like animal developing habits and acquiring the first dawning of human speech. Why were these intelligent beasts confined to the Miocene Age?

The real advances of science have been based on fact. A true scientific theory should no more be based on missing links than a true logical proposition can be based on a *non sequitur*.

All that we know of Man emphasises the vast gulf between the lowest of men and the highest of animals. The Australian aborigines are the most backward of races, yet they invented the boomerang which the wisest of apes could not handle or understand.

Mivart declared that there was a wider break in nature between man and the highest ape, than between the highest of apes and an oyster, and even Darwin admitted that the Fuegians who "rank amongst the lowest barbarians . . . resembled us in disposition and in most of our mental faculties."

Again, all that we know of prehistoric man suggests that man from his first appearance on the globe, was as immeasurably superior to the highest animals as are the lowest and least intelligent of modern savages.

The first rude outline of a reindeer drawn on the cave walls tells its own tale, the tale of a complete break with the past, of the intrusion into the world process of something entirely new, the spirit of creative man. No finger but man's has "ever traced one significant line upon the

sand . . . or begun to scratch the faint suggestion of a form. . . . Art is the signature of man."¹

Disabuse your mind of the belief that science has, if indeed science ever will be in a position to demonstrate the bestial origin of man. Skulls and skeletons at best emphasise the physical resemblance between man and the apes, resemblances which nobody disputes, but they do not bridge the spiritual gap between the chattering ape and man endowed with speech.

Much apparently is expected of these skulls recently discovered in China. Poor old Pithecanthropus seems to have been disowned by the popular Press in favour of his lastest rival Sinanthropus. It is, of course, interesting to rediscover original man in Sinanthropus, and the name, with its happy suggestion of original sin, should please the fundamentalists. But it is difficult to understand how any such discovery can throw light on man's origin.

We may cheerfully admit that the body of man was descended from the body of an ape-like ancestor, though exact proof is wanting, and we can yet continue to believe that the first man differed radically, in degree and not only in kind, from the last ape by the possession of spiritual and intellectual powers, the intrusion of which into a body of bestial origin was the result of a definite creative act.

Or again, man may have been a sudden mutation, a theory which has been developed very persuasively by Dr. Milum in his interesting book, *Evolution and the Spirit of Man* (The Epworth Press).

Dr. Milum believes that man, like other creatures, is the product of genetic evolution, and he suggests not only that man represents a definite mutation, but also that man represents the culmination of an evolutionary process along a separate path reserved for those creatures destined to evolve into man.

"If any biologist had set out to establish a case for a separate path that led to man, he would have been suppressed officially. Any 'case' made for such a position

¹ *The Everlasting Man*, by G. K. Chesterton, page 32.

would be suspect. But now, by a process of exclusion of other paths, the uniqueness of the path that was to culminate in man invites our hesitant faith. What saved that feeble and defenceless prototype of higher life from destruction; what prevented a premature specialisation for the satisfaction of its creature need? The only available biological answer is that by relying upon its psychic qualities it found escape. At every stage in geologic time, when the great groups spread out fanwise by various specialisations, the main line conserved itself, and kept to psychic development. At length this tendency, fostered through so many ages of orthogenetic development and proceeding, as we imagine, by a series of mutations, culminates in the production of a being with a brain adequate for an altogether different mode of dealing with the world."

It is an interesting theory, and perhaps as plausible as many of those which have the support of orthodox science. I am no scientist, and I have no theory to suggest. I am not concerned either to prove or to disprove any particular theory of man's origin, but merely to protest against the dogmatism of those who pretend that this great riddle has been solved.

"The only statement," wrote the great botanist, Reincke, "consistent with her dignity that science can make is to say that she knows nothing about the origin of man."

VI

The will to believe is, at least, as potent among scientists as among theologians. The evidence for genetic evolution is, for instance, far weaker than the evidence for telepathy and no stronger than the evidence for ectoplasm. And yet, the overwhelming majority of scientists reject ectoplasm and accept evolution. They are influenced by the will to believe in evolution, and by the will to disbelieve in ectoplasm. The former satisfies and the latter fails to satisfy their æsthetic, no less than their scientific, standards.

Mr. H. G. Wells, and his son, and Professor Julian Huxley recently co-operated in producing a popular work, entitled *The Science of Life*, which I have read with lively interest. It is admirably written and admirably illustrated. "Evolution beyond Dispute," is the title of one of the parts. Psychical Research is also discussed with great fairness, and the authors deserve to be congratulated on realising that science can no longer afford to ignore this perplexing branch of research.

Of the remarkable experiments in telepathy between Professor Gilbert Murray and his daughter these authors write as follows:

"Results have been got by these two of a quality and exactitude difficult to explain by any other hypothesis than that of a direct thought transmission."

Let us compare the evidence for telepathy with the evidence for the theory that birds are descended from reptiles.

There is no *direct* evidence for the evolution of reptiles into birds, a process which, if it ever took place, has mysteriously ceased. There is no direct evidence of any modern reptile showing a tendency to develop into an ancestor of the bird of the future.

On the other hand, there is a mass of unimpeachable direct evidence for telepathy.

Again, the theory of telepathy, though inexplicable by science, is not in flat contradiction to other facts. The theory that birds developed from reptiles is, however, very difficult to reconcile with the absence of transitional forms.

Our authors do not treat evolution as a working hypothesis but as an established dogma—"Evolution beyond dispute." They adopt, however, a very cautious attitude towards the evidence for telepathy which is overwhelmingly stronger than the evidence for genetic evolution. "There remains enough," they write, "to justify an attitude of critical indecision."

Much the same might be said with far greater justice of the theory of genetic evolution. A plausible case has

been made out for evolution, but in view of the admitted difficulties we are not entitled to describe this theory as anything better than a good working hypothesis.

It is the lack of logic so common in evolutionary literature, not the theory of evolution itself, to which one takes exception. There is a growing tendency to treat missing links, not as defects in an argument, but as strengthening in some mysterious fashion the chain from which they are missing. The missing link is subpoenaed, not only to prove the existence of a continuous chain, but also to demonstrate the imperfections of the geological record. "There is not," as the great scientist A. R. Wallace remarked, "as is often supposed, one missing link to be discovered, but at least a score of such links, to fill adequately the gap between man and apes; and their non-discovery is now one of the strongest proofs of the imperfection of the geological record."¹

Why is the geological record imperfect? because we continue to miss the missing links. Why do we miss the missing links? because the geological record is so imperfect.

NOTE.—The assertion is sometimes made that Natural Selection can be seen at work. Of course it can. A severe epidemic is an example of Natural Selection at work. The fittest are the last to succumb. And the other examples of Natural Selection at work, e.g. those in Professor Haldane's interesting book *Possible Worlds*, have no more bearing than the case of the epidemic on the real question at issue, the power of Natural Selection to transform one species into another. The reader can test the strength of any modern argument for Darwinism by noting whether objection (3) on page 59, is fairly and squarely met, and he can test the value of any argument for evolution by noting whether the argument is confined to proving what nobody denies, that wide variations are possible within the limitations of a given type. To prove evolution you must prove not merely that the horse has evolved from a horse-like ancestor but that the bird has evolved from the reptile. All attempts to explain the Origin of Species either by Special Creation or Genetic Evolution are riddled with difficulties. My own attitude is one of complete agnosticism so far as the *modus operandi* of creation is concerned.

¹ *The World of Life*, by A. R. Wallace.

CHAPTER XVII

UTRUM DEUS SIT

I

THE theory of genetic evolution may be plausible and, perhaps, very probable, but it is none the less grossly unscientific to promote this theory, as Weismann and others promoted it, from the category of a working hypothesis to the domain of law, and then to deduce from this "law" conclusions against the weight of scientific evidence.

The dogma of spontaneous generation is a case in point, for this dogma is *de fide* for pious Darwinians who reject theism.

It is important to realise that whereas the atheist is compelled to accept, the theist is under no obligation to disprove spontaneous generation. Thomas Aquinas, for instance, neither affirmed nor denied spontaneous generation. All he denied was the thesis put forward by Avicenna that inanimate matter produced life by its own inherent powers. Aquinas maintained that if inanimate matter does produce life, matter must have been endowed by God with special powers for this purpose.

Spontaneous generation was, in fact, widely accepted until an Italian physician, Redi, proved that no maggots developed in meat which had been protected by gauze screens. Spallanza proved that putrefaction does not develop in fluids which have been boiled and which are kept in hermetically sealed vessels, and Pasteur provided still more exact proofs in support of the theory that to exclude infection is to exclude generation of new life. Pasteur's verdict is almost universally accepted to-day,

and the complete failure of comparatively recent experiments to develop life from lifeless matter have still further strengthened the case against spontaneous generation. In that popular work, *The Science of Life*, from which I have already quoted, there will be found a portrait of Pasteur, under which is written: "Louis Pasteur who gave the death-blow to the theory of Spontaneous Generation," but apparently the theory is not yet dead, for on the opposite page we are informed that "at some remote time in the remote past, when the earth was hotter and its air and crust differed, physically and chemically from their present state, it seems reasonable to suppose that life must have originated in a simple form from lifeless matter."

But why is it "reasonable to suppose" that spontaneous generation is facilitated by a rise in temperature? Life is only possible within narrow limits of temperature all of which can be duplicated in our laboratories to-day. Again, why should a chemical difference in the crust of the earth's surface facilitate spontaneous generation?

The Science of Life is written for the benefit of Mr. Everyman. The chapter on "Habitats" opens with a word-picture of Mr. Everyman's home. "In this little domain live Mr. and Mrs. Everyman, with their son, Master Everyman, one domestic servant, a tabby cat and a fox-terrier." Every fortnight the stuffy atmosphere of this suburban home is ventilated by the invasion of a new part of *The Science of Life*. And as the family gather round the fire, Master Everyman learns that it is no longer necessary to believe in God, for life may reasonably be supposed to have originated thanks to temperature. Mr. Everyman, one hopes, will be impressed by his kindly and condescending teachers and will assume that it is "reasonable to suppose" that Mr. Wells and Professor Huxley have some real evidence up their sleeve on the spontogenerative powers of a rising temperature.

Mr. Wells has some respect for Mr. Everyman. He does not suggest that life came to this planet on a wandering meteor.

To explain life in this way is, as Mr. Chesterton somewhere says, very much like explaining the presence of a ghost in the churchyard by saying that he must have come from the churchyard in the neighbouring parish.

Darwin disbelieved in spontaneous generation, and Huxley referred with contempt to "the rich absurdities of spontogenesis."

In the last chapter I have referred to Lyell's book which inaugurated modern geology. The subsidiary title of that book was "An attempt to explain the former changes of the earth's surface by reference to causes now in operation." Lyell, in other words, believed in the uniformity of Nature. Tyndall, again, emphasised this point. "Men of science," he wrote, "prolong the method of Nature from the present into the past. The observed uniformity of Nature is their only guide."

The scientist, therefore, if he was logical, should argue as follows:

1. The earth began as a red-hot globe on which no life was possible.
2. Life has since appeared on the surface of the globe.
3. Science has no record whatever of the emergence of life from inorganic matter. All attempts to prove spontaneous generation have failed.
4. Guided as we must be by the uniformity of Nature, we must assume as a working hypothesis that spontaneous generation has never taken place, and that life owes its origin to a supernatural and not to a natural act.

We cannot, of course, prove a universal negative. We cannot demonstrate that spontaneous generation has never taken place, but we can show that the weight of evidence is overwhelmingly against spontaneous generation, from which it follows that it is more logical to accept as a working hypothesis the supernatural origin of life.

But no such logical conclusion was possible to men whose reactions to this problem were confused by theophobia.

I have already quoted Weismann's naïve remark, "Spontaneous generation, in spite of all vain efforts to

demonstrate it, remains for me a logical necessity," and Herbert Spencer's illuminating pronouncement that at a time "when the temperature of the surface of the earth was much higher than at present, and other physical conditions were unlike those we know, inorganic matter, through successive complications, gave origin to organic matter."

This verbose verdict is characteristic in its attempt to palm off as an explanation the question-begging phrase "successive complications."

Huxley, in the course of a presidential address to the British Association on "Biogenesis and Abiogenesis," expressed the opinion that the biogenesists who denied spontaneous generation had been victorious all along the line, but he added that if it were given to him "to look beyond the abysses of geologically recorded time" he would expect "to be the witness of the evolution of living protoplasm from not living matter."

Huxley distinguished, it is true, between "belief" and "expectation," and he did not dare "in the admitted absence of evidence" to profess belief in spontaneous generation, but he asked his audience to accept his opinion that spontaneous generation had taken place in the remote past as "an act of philosophic faith." It is easy to imagine the fine scorn with which Huxley would have overwhelmed a bishop who had drawn such fine distinctions between "belief" and "religious faith," and the retort which Gladstone would have provoked had he opened his controversy with Huxley on Genesis with some such words as these:

"If it were given to me to look beyond the abyss of historically recorded time, I should expect to be a witness of the emergence of Eve from Adam's rib."

What justification did Huxley offer for his "philosophic faith" that spontaneous generation had occurred at a remote date? He admitted that all attempts to prove spontaneous generation had failed, but he maintained that spontaneous generation was "a necessary corollary from Darwin's views if legitimately carried out." In other words, though evolution, uncon-

taminated by supernatural intervention, was the very thing which Huxley was trying to prove, he appears to have considered it scientific to assume the existence of the facts he required against the weight of evidence, merely because those facts were indispensable to the theory.

One more "missing link" whose absence proves the existence of a continuous chain.

II

Reason is subject to Gresham's Law. Bad logic drives out good.

Huxley, who was naturally a logical thinker, admitted that theism was unaffected by science, that "the philosophical difficulties of theism are neither greater nor less than they have been ever since theism was invented." He admitted that "'creation' in the ordinary sense of the term is perfectly conceivable" and that "the a priori arguments against theism, and given a deity, against the possibility of creative acts, appear to me devoid of reasonable foundation." And yet, at other times, he was forced into a position logically untenable in his efforts to evade formal recognition of the theistic hypothesis.

Again, Professor Clifford in his controversy with Dr. Martineau admitted quite cheerfully that the theistic hypothesis was "reasonable", "an explanation of the facts" and "unavoidably suggested by the categorical imperatives of the moral sense." And yet, the whole trend of Professor Clifford's philosophy was definitely atheistic.

The minds of these men were closed against the evidence for the supernatural. "It has always been out of the question for me," wrote Herbert Spencer, "to go on reading a book, the fundamental principles of which I entirely dissent from. . . . I take it for granted that if the fundamental principles are wrong the rest cannot be right."

It was this attitude of mind, this refusal to sit down before any fact conflicting with personal prejudices,

prejudices disguised as "fundamental principles," which explains so much that is inconsequent and irrational, not only in Spencer's writings but in evolution literature in general.

It is again to the scientists of Spencer's generation that we owe the popular view according to which science establishes agnosticism, a notion which, as Mr. Chesterton justly remarks, is "a sort of mystification produced by talking Latin and Greek instead of plain English. Science is the Latin for knowledge; Agnosticism is the Greek for ignorance. It is not self-evident that ignorance is the goal of knowledge."

"I cannot admit," wrote Lord Kelvin, perhaps the greatest scientist of the nineteenth century, "that with regard to the origin of life science neither affirms nor denies creative power. Science positively affirms creative power which it compels us to accept as an article of faith."

III

One is chiefly impressed, not by the scepticism, but by the credulity of the leading Victorian philosophers. They accepted Natural Selection by faith, and by faith they assented to the more outrageous deductions from Darwinism. According to Darwinism environment, all-powerful and all-sufficing, replaces intelligence and purpose as the agent of evolutionary change. According to Mr. Herbert Spencer, environment is the master-key to history. History is made, not by individuals, but by geography. Great men are not, as is commonly supposed, the causes of the movements associated with their names. A Napoleon or a Luther merely served to register and to advertise the world movement which has thrown each individual to the surface, a world movement which is the resultant, not of spiritual, but of physical causes. The flowering of Greek culture was, so Mr. Grant Allen believes, "the product of the geographical Hellas acting upon the given factor of undifferentiated Aryan brain." He adds, "We cannot regard any nation as an active agent

in differentiating itself, and only the surrounding circumstances have any effect in such a direction."

"Can it be," wrote William James, "that Mr. Spencer holds the convergence of sociological pressures to have so impinged on Stratford-upon-Avon about the 26th of April, 1564, that a W. Shakespeare, with all his mental peculiarities, had to be born there—as the pressure of water outside a certain boat will cause a stream of a certain form to ooze into a particular leak? And does he mean to say that if the aforesaid W. Shakespeare had died of *cholera infantum*, another mother at Stratford-upon-Avon would needs have engendered a duplicate copy of him, to restore the sociologic equilibrium—just as the same stream of water will reappear, no matter how often you pass a sponge over the leak, so long as the outside level remains unchanged? Or might the substitute arise at Stratford-atte-Bowe?"

No theologian has ever been more exacting in his demand for faith than Mr. Spencer. Here is his explanation of the origin of music. Strong emotions, according to Mr. Spencer, are associated with muscular exertion. The muscles of the abdomen contract and expand under emotional stress, and the noises which result revive by association the pleasurable emotion which engendered them. To this primordial coincidence we owe first of all cadenced speech, and then music.

And here is Cardinal Newman's explanation:

"Can it be that these mysterious stirrings of heart, and keen emotions, and strange yearning after we know not what, and awful impressions from we know not whence, should be wrought in us by what is unsubstantial, and comes and goes, and begins and ends in itself? It is not so; it cannot be. No; they have escaped from some higher sphere; they are the outpourings of eternal harmony in the medium of created sound; they are echoes from our Home; they are the voice of Angels, or the magnificat of Saints, or the living laws of Divine government, or the Divine Attributes; something are they beside themselves,

which we cannot compass, which we cannot utter—though mortal man, and he perhaps not otherwise distinguished above his fellows, has the gift of eliciting them."

Which explanation is the greater tax on our credulity? Is it easier to believe that music delights us because it causes emotions associated with some primeval howl at the sight of food, or that music opens a window into a world of eternal values?

One of the penalties attached to the Victorian heresy was that clever men like Mr. Spencer and Mr. Grant Allen were condemned to deduce from their faulty premises conclusions of the absurdity of which they were probably uneasily conscious.

That men and animals are automata, and that thought and feeling have no influence on action is again a perfectly logical deduction from the Victorian heresy.

"Professor Huxley," says Mr. Romanes, in his Rede Lecture of 1885, "argues by way of perfectly logical deduction from this statement, that thought and feeling have nothing to do with determining action; they are merely the by-products of cerebration, or, as he expresses it, the indices of changes which are going on in the brain. Under this view we are all what he terms conscious automata, or machines which happen, as it were by chance, to be conscious of some of their own movements. But the consciousness is altogether adventitious, and bears the same ineffectual relation to the activity of the brain as a steam-whistle bears to the activity of a locomotive, or the striking of a clock to the time-keeping adjustments of the clockwork. . . . Now this theory of conscious automatism is not merely a legitimate outcome of the theory that nervous changes are the causes of mental changes, but it is logically the only possible outcome. Nor do I see any way in which this theory can be fought on grounds of physiology."

This view also met with the approval of Professor Clifford and Mr. Spalding who, in the course of an

article which he contributed to *Nature* on August 2nd, 1877, wrote as follows :

"We assert not only that no evidence can be given that feeling ever does guide or prompt action, but that the process of its doing so is inconceivable."

Samuel Butler quotes other passages from contemporary scientists in favour of the theory that mental processes have no effect on physical processes, from which, as he remarks, it is obvious that they must have supposed "that physical processes would go on just as well if there were no accompaniment of feeling and consciousness at all."

Men and animals are permitted, according to this theory, to think and to feel and even to reflect, but everything would go on exactly the same even if the consciousness which is a mere by-product of the physical movement in their brains did not exist. Juliet would set up precisely the same physical movements in the brain of Romeo even if Romeo and Juliet were both automata. The clues left by an unconscious murderer would produce just the same physical effect on the brain of an unconscious detective, and the unconscious witness in the witness-box would set up exactly the same physical reaction as the brains of an unconscious jury and of an unconscious judge. And finally an unconscious hangman would then proceed to hang an unconscious murderer.

That thought and consciousness are impotent spectators of the drama of life is a logical deduction from the Victorian heresy, and as such clearly refute the heresy in question.

Clearly we need waste no time in disproving the thesis that action is uninfluenced by thought, though we may well inquire how such a grotesque conclusion could ever have been entertained by men of intellect.

Materialism has a certain superficial plausibility. The scientist is mainly concerned with the metrical aspects of reality. He finds that most phenomena can be expressed in terms of matter and motion, and he is sometimes

tempted to suppose that the residue of non-metrical facts have no real significance.

Materialism is as complete and as irrefutable an explanation of the universe as the lunatic's explanation of his presence in an asylum. You cannot disprove the lunatic's thesis that the rest of the world is mad, and that he alone is sane. You cannot dispute the materialist's thesis that the overwhelming majority of mankind has been completely mistaken, and that the materialist alone is completely right. The insane explanation is, as Mr. Chesterton has remarked, "if not conclusive at least unanswerable. . . . If a man says (for instance) that men have a conspiracy against him, you cannot refute him except by saying that all the men deny that they are conspirators; which is exactly what conspirators would do. His explanation covers the facts as much as yours. Or if a man says that he is the rightful King of England, it is no complete answer to say that the existing authorities call him mad; for if he were King of England that might be the wisest thing for the existing authorities to do."¹

The materialist, like the madman, is not hampered "by the sense of humour or by the dumb certainties of experience." And of these dumb certainties there is none more sure than that our wills are free, and that the choice between good and evil represents a real option which we are free to accept or to reject.

The Victorian scientist always tacitly assumed that he was entitled to the verdict provided that the theories which he advanced could not be definitely refuted, but he was not prepared to allow Bible Christians to avail themselves of this curious principle. Huxley, for instance, would have rejected with contempt Mr. Philip Goss's theory that Almighty God had created the world in the twinkling of an eye, fossils and all complete; but he could never have refuted this absurd view.

The most grotesque theories are often the most difficult to refute. There is no logical answer to the

¹ *Orthodoxy*, by G. K. Chesterton (the Bodley Head), pages 30-31.

complete sceptic who doubts his own existence. Those who part company with the complete sceptic must begin by making certain assumptions which cannot be demonstrated beyond all possible doubt. The theologian and the scientist both tacitly assume that the universe is rational, but the theologian can no more demonstrate that the will is free than the scientist can demonstrate that the sun will rise to-morrow. The theologian cannot disprove by pure logic that the mind is a by-product of matter, and the scientist cannot disprove by science or by logic that the lunatic alone is sane in a mad world.

God gave us dialectics to refute the errors of men who argue incorrectly from sane premises. He gave us laughter, and "the dumb certainties of experience" as our only adequate answer to those who argue correctly from premises which are fundamentally insane.

Thought is impossible without some assumptions. The assumption that the external world exists as the basis of science, is more open to doubt than the assumption that there is a difference, not only of degree but of kind, between Shakespeare and a sewing-machine.

Utrum Deus sit. Those who do not find the right answer to this, the second *quaestio* in the *Summa Theologica*, will inevitably pay for their failure by losing touch with reality. Those who doubt the existence of mind behind creation are very likely to end, as the Victorian heretics ended, by doubting the reality of their own mental processes.

Those who deny the Creator are apt to make a sad mess of things when they try to explain creation.

CHAPTER XVIII

PSYCHICAL RESEARCH

I

THE survival of the soul may or may not have been demonstrated by Psychical Research. There is room for a legitimate difference of opinion on this point, but it is no longer possible to deny telepathy, a fact of tremendous consequence. Telepathy cannot be explained by any analogy from wireless. If thoughts travelled along wave-lengths, reception would vary in accordance with a definite mathematical formula, but telepathy often fails between the same two experimenters at close distances and succeeds when the distance is increased. Telepathy obeys no mathematical law. It is utterly capricious. It is essentially psychic, and as such may be held to have dealt a mortal blow to the Victorian heresy.

The failure of organised science to appreciate the importance of Psychical Research is symptomatic. Huxley's reaction to the facts of Home's mediumship has already been recorded.

Huxley's was the normal attitude. It was left to men like A. R. Wallace, who all but anticipated Darwin, Sir William Crookes, Sir William Barrett and Sir Oliver Lodge to blaze the new trail. Huxley did not lack moral courage at times. He could make a stinging retort to a bishop, and was the sworn foe of clericalism, but it took more courage to be rude to bishops in the sixteenth than in the nineteenth century. The real test of scientific courage in the Victorian age was to examine the brief for Spiritualism. The Victorian successors to Roger Bacon and Galileo were not the men who made a great show of

braving a defenceless Church, but those who were prepared to court ridicule and contempt—the Victorian substitute for medieval persecution—rather than abandon a form of scientific research pregnant with the most momentous consequences for the human race.

Psychical Research is concerned with the greatest of all problems, the existence of a supernatural world, and the survival of the soul.

Had the Victorian scientists been guided by rational considerations, they would have realised that it is at least as important to establish the existence or non-existence of a supernatural world as to decide by what particular process reptiles are transformed into birds. It was not as if they were being asked to investigate the evidence for happenings at variance with the universal experience of mankind. Every age and every country has contributed its quota to that vast accumulation of evidence on which is based the belief in a supernatural world. It is only in comparatively recent times that it has been considered a mark of common sense to reject, rather than to accept, the miraculous and the supernormal. Again, it was not as if Huxley was being asked to investigate a fact in which no person of education or scientific training believed. The report of the Dialectical Society on Home's mediumship, coupled with the adherence of that most distinguished scientist, Sir William Crookes, provided a strong *prima facie* case for investigation.

The indifference with which the facts of the séance room were regarded was, as Sidgwick said forty years ago, one of the scandals of scientific research. For if the facts, as stated by men like Crookes, Barrett and Wallace, were true, they were fraught with incalculable consequences.

We flatter ourselves that we are more hard-headed and practical than the medievalists. We are more mystical. We act as if we believed that all scientific facts are equally important however little bearing they have on our lives. Whether Einstein is right or not is a matter of very little practical importance, but whether Sir Oliver Lodge is

right or not is a matter of enormous significance. And yet, Sir Oliver Lodge commands a hearing in spite of, rather than because of his devotion to Psychical Research. He is honoured as an authority on the ether, not as an authority on the other world.

Many years will pass before a promising young scientist will feel tempted to take up Psychical Research in the hope of financial or other rewards. A knighthood would, no doubt, be considered the appropriate reward for a man who discovered a new world on the outskirts of the solar system. "Forty shillings or a week" is the correct recognition for the mediums whose peculiar gifts help to establish the probability of another world, far more important in its general consequences to mankind than any world in the solar system.

If we were rational, we should refuse to leave open this great question of immortality. We should insist on the Government continuing to subsidise Psychical Research until we had satisfied ourselves beyond all reasonable doubt that the great riddle was insoluble, and Psychical Research was doomed to sterility. The Government voted Shackleton a sum of money on his return from his attempt on the South Pole, but no man, woman or child has ever been a penny richer for all Antarctic discovery. A Government, however, which voted £20,000 for Psychical Research would probably be out of office in a day.

Again, the very existence of the Churches is bound up with the belief in immortality. It would be idle to protest that the arguments advanced by the Churches in support of that belief compel acquiescence. Nobody will deny that the Churches would regain much of their old power and much of their old influence if the belief in immortality could be scientifically demonstrated. But it is easy to imagine the protests which would follow if a bishop appealed for funds for Psychical Research.

A future age will, perhaps, dismiss our lack of interest in Psychical Research as an inexplicable curiosity in the story of science.

II

Psychical Research is a useful touchstone to discriminate between the apriorist and the empiricist. In every age and in every society the genuine empiricists have been hopelessly outnumbered by the apriorists. It is the mark of greatness to be open to new evidence which conflicts at every point with the prejudices of a lifetime. Most men and most scientists are the prisoners of the mental climate in which their minds matured.

The Victorian materialist was a fine specimen of the finished apriorist. His mind was hopelessly closed to new evidence which conflicted with his materialistic philosophy. He dismissed all evidence of the supernormal by repeating with simple faith that grand old Victorian dogma, "Miracles don't occur." "Even if all the sick in Lourdes," exclaimed Zola, "were cured in one moment, I should not believe in miracles."

The apriorist type changes, of course, from age to age so far as his mental outlook is concerned, though not so far as his approach to new truths is concerned. The fifteenth-century apriorist condemned witches to be burnt alive because the scientists of those days still believed in magic. The Victorian apriorist dismissed all supernormal phenomena as grotesque because the Victorian apriorist cherished an apriorist prejudice against the possibility of the supernatural.

Kepler was handicapped in his astronomical researches by his *a priori* conviction that it would be undignified for a planet to move in any but a perfectly circular orbit. The modern scientist is no less handicapped by his conviction that spirits, if they exist, would not behave in an undignified fashion. In Kepler the empiricist ultimately overcame the apriorist. He realised that it was more important to collect evidence as to the movements of planets than to dismiss on *a priori* grounds evidence which tended to show that planets moved in ellipses. Crookes and Barrett believed that it was more important

to collect evidence as to the supernormal than to hamper themselves at the outset by laying down laws as to how spirits should behave.

Even on a priori grounds it is difficult to understand why in the whole universe this world alone should be the scene of undignified and trivial happenings. Huxley and his contemporaries, of course, were unconsciously influenced by the Heaven and Hell of the family Bible. "I don't believe in immortality, and I don't believe in Heaven," is, in effect, the burden of their creed. "But if spirits do exist, I am quite sure that St. John the Divine is a more accurate guide to the spirit world than Mr. Sludge the medium."

One can sympathise with his attitude, just as one can sympathise with those who would prefer, as I should prefer, extinction to life in the spirit world portrayed in popular spiritualistic literature. It is none the less unscientific to allow one's prejudices in such matters to dictate the verdict.

I have already quoted from that popular treatise *The Science of Life*. The authors of that treatise conclude their review of the remarkable American medium "Margery" in these words:

"We cannot absolutely reject the evidence for these phenomena.... Yet it is a lesser improbability to suppose that a charming lady, an eminent entomologist, some highly respectable Bostonians and a few privileged visitors have been mistaken in their impressions or inaccurate and imperfect in their accounts of what happened on certain obscure and secluded occasions, than that all the rest of our general ideas about life are wrong."

Much the same might have been said by apriorist Victorian bishops when confronted with geological evidence which suggested that their general ideas about creation were wrong.

I do not, however, think that we are entitled to reject psychical phenomena merely because their genuineness

implies that Mr. Wells and Professor Julian Huxley are a little out-of-date in "their general ideas about life."

III

It is important at the outset to distinguish between facts which Psychical Researchers claim to have established in the séance room, and the various attempts that have been made to explain those facts. It is perfectly possible to accept the genuineness of Psychical phenomena and to reject the spiritist explanation. Indeed, most of the leading Continental investigators are convinced of the reality of supernormal phenomena, such as ectoplasm, telekenesis, etc., but believe that these phenomena are capable of a purely naturalistic explanation, an explanation which it is the task of science to discover. Professor Charles Richet, a firm believer in materialisation, describes himself as a materialist, and does not believe in survival.

Psychical phenomena are divided into two great classes: subjective and objective. Subjective phenomena are purely mental. A medium in trance conditions reveals knowledge of facts which, it is alleged, could not have been acquired normally, facts whose accuracy can subsequently be established by investigation.

Objective phenomena, on the other hand, are physical phenomena inexplicable by ordinary mechanical laws, the movement of objects without contact, levitation, telekenesis, materialisation, etc.

The true believer regards physical phenomena as rather vulgar, useful for converting sceptics, but of no interest to those of the true faith. The convinced spiritualist frequents mediums, not in order to see tables lifted into the air, but in order to get into touch with another world, and to receive from that world inspiration and spiritual help.

To the sceptic, on the other hand, objective phenomena are far more interesting than subjective. Prove that psychic power can levitate a table six inches from the

ground, and you have established a fact which has upset orthodox dynamics.

So far as physical phenomena are concerned, no medium has yet surpassed the remarkable performances attributed to Daniel Douglas Home.

Daniel Douglas Home was born in 1833. His career as a medium lasted for thirty years, and it is on record that he never once accepted any payment for his services. In 1857 he declined an offer of £2000 from the Union Club in Paris for a single séance. Home had a small private income which barely sufficed for his needs, for he was a consumptive and in constant need of medical attention. None the less he refused this offer. "I have been sent on a mission," he said. "That mission is to demonstrate immortality. I have never taken money for it and I never will."¹

Home was never detected in fraud, and the only incident in his long career which could be twisted to discredit him was the unfortunate lawsuit in which he was involved.

A Mrs. Lyon, a rich woman, insisted upon settling a large sum of money on Home. The original letters, which can still be consulted, prove that both Home himself and his solicitor did their best to persuade Mrs. Lyon to moderate "her unreasonable benevolence." Some time afterwards her benevolence turned to active hostility. She demanded the return of her money, and her demand, according to Sir Arthur Conan Doyle, was framed in such a fashion that Home could not have agreed without implying that he had done wrong in accepting the original gift.

The case was tried in the Court of Chancery. The judge alluded to Mrs. Lyon's "innumerable misstatements on many important particulars—misstatements upon oath, so perversely untrue that they have embarrassed the Court to a degree and quite discredited the plaintiff's testimony."

¹ *The History of Spiritualism*, by Arthur Conan Doyle, Vol. I, page 193. (Cassell.)

The judge, however, was strongly prejudiced against spiritualism, and was irritated with the persistence with which Home maintained his claim to spiritualistic powers. Even had the judge been more friendly, it is doubtful whether a Victorian jury would ever have awarded the verdict to a notorious medium.

Home was a man with a wide circle of friends, of whom he did not lose one as a result of this lawsuit.

The following discriminating tribute to Home is quoted from the late Lord Dunraven's preface to the 1924 reprint of *Experiences in Spiritualism with D. D. Home*.¹

"I came across Mr. D. D. Home," wrote the fourth Lord Dunraven, who was Viscount Adair at the time, "long ago in Paris. I forget under what circumstances, but they had nothing to do with spiritualism or with his mediumship. My meeting him again in 1867 was fortuitous. Circumstances in the shape of rheumatism, or rheumatic gout, led me to Dr. Gully's hydropathic establishment at Malvern, and there I became acquainted with Mr. Home, who was staying with Dr. Gully as a guest. I was attracted by some phenomena which took place immediately. I liked Mr. Home. He had the defects of an emotional character, with vanity highly developed (perhaps wisely to enable him to hold his own against the ridicule and obloquy that was then poured out upon spiritualism and everyone connected with it). He was liable to fits of great depression and to nervous crises difficult at first to understand; but he was withal of a simple, kindly, humorous, lovable disposition that appealed to me."

"I struck up an intimate friendship with him," continues Lord Dunraven, "and spent a great deal of time during the next two years in his company, with the result that the phenomena, which are here recorded, occurred at all times and seasons, under all sorts of conditions—in broad daylight, in artificial light, in semi-darkness, at regular séances, unpremeditatedly without any séance at all, indoors, out of doors, in private houses, in hotels—at

¹ Reprinted and published by the Society for Psychical Research, 1924.

home and abroad, and it is probable that to that extent these experiences are peculiar. They were printed by my father in order to preserve them, but for rigidly private circulation which was obviously necessary at the time."

Lord Dunraven then proceeds to explain the reasons which had led him to abandon psychical research.

"My belief in the genuineness of the phenomena remained unshaken, and my friendship with Mr. Home did not diminish or change. The simple reason is that having satisfied myself that the facts were not due to trickery or fraud, I found that I made little progress after a certain point. . . . Study of the occult was not congenial to me. I was only twenty-four and I had my ambitions and plans for my life. I loved sport and an active 'out-of-doors' life. All my instincts were to deal with the physical world and the material aspects of life, and I did not feel myself competent to deal with anything else."

Home never seems to have insisted on darkness. He produced his phenomena in the light that happened to be available, in broad daylight, artificial light or semi-darkness as the case might be.

I have already quoted from the report of the London Dialectical Society, thirty members of which were present at no less than fifty séances.

The father of the late Lord Dunraven contributed an introduction to the privately printed volume of 1870, and in this introduction he stated that he was induced to examine the mediumship of Home by Sir David Brewster, a well-known Victorian man of science.

Sir David Brewster was present at a séance held in daylight and witnessed a table rising from the ground without its being touched by any of those present.

He also heard a small hand-bell ringing when nothing could possibly have touched it. The bell then came over and placed itself in his hands. Among the witnesses present were Lord Brougham, and Mr. Cox, the owner of Cox's Hotel in Jermyn Street.

Sir David Brewster concluded a letter to his sister with

the following words: "These were the principal experiments. We could give no explanation of them, and could not conjecture how they could be produced by any kind of mechanism."

Lord Dunraven met Sir David Brewster on the steps of the Athenæum. Sir David "spoke most earnestly, stating that the impression left on his mind from what he had seen, was, that the manifestations were to him quite inexplicable by fraud."

Sir David Brewster, in the course of a letter to a friend in America, described this sitting. The friend published the letter, which was reproduced in the English press to the great distress of Sir David Brewster, who had good reason to dread that he would lose prestige and standing in scientific circles unless he promptly disowned all belief in the supernormal. He, therefore, wrote a letter to the *Morning Advertiser* to state that though he had seen inexplicable mechanical effects, he was none the less satisfied that they could all be produced by human hands and feet.

Afterwards, when the letter to his sister, which has just been quoted, was published, the *Spectator* passed some severe comments on the contrast between his private convictions which he had voiced to his sister, and his public repudiation of those convictions. "The hero of science," wrote the *Spectator*, "does not acquit himself as one could wish or expect."

Lord Dunraven's account opens with the names of fifty people who were present. "All the persons present," he wrote, "at the following séances, with the exception of three or four to whom access cannot be obtained, have received a copy of the account of the séances which they witnessed, with a request that if the report coincided with their own recollection of what took place, they would kindly allow their names to be appended, as testifying to its accuracy. Every answer has been in the affirmative as to the correctness of the accounts; but a very few have, for prudential reasons, preferred that their names should not appear."

Among the many phenomena recorded may be mentioned several instances of Home's power, not only to handle red-hot coal himself with immunity, but also to confer the same immunity on the sitters. Here is a characteristic example:

"The Master of Lindsay, the Rev. Mr. Y—, and his wife, Mr. and Mrs. Hall, and the Misses Bertolacci held a séance with Mr. Home in 1869. Home drew out of the fire a live burning coal and placed this lump on the head of a sitter, Mr. S. C. Hall. "Someone said, 'Is it not hot?' Mr. Hall answered, 'Warm, but not hot!'" Mr. Home "proceeded to draw up Mr. Hall's white hair over the red coal. The white hair had the appearance of silver threads over the red coal. Mr. Home drew the hair into a sort of pyramid, the coal still red, showing beneath the hair." Three of the sitters attempted to touch the coal, "but owing to lack of faith" it burnt their fingers. "When Mr. Hall brushed his hair at night he found a quantity of cinder dust."

Home completed a similar séance by placing the coal on a piece of paper, which immediately blazed up.

Many striking instances of levitation are recorded, of which the following is, perhaps, the most striking. On December 13th, 1868, a séance was held at which Lord Lindsay, Lord Adare, who, as Lord Dunraven, reprinted this record in 1924, and Captain Wynn were present. Home, in a state of trance, floated out of the bedroom window, which was at a height of seventy feet above the street, and into the sitting-room in which Lord Adare, Lord Lindsay, and Captain Wynn were sitting. Home told Adare to shut the window in the bedroom from which he had come. Adare did so, and on returning remarked that the window "was not raised a foot," and that he could not imagine how Home had managed to squeeze through. "Home arose and said, 'Come and see.' I went with him; he told me to open the window as it was before, I did so: he told me to stand a little distance off; he then went through the open space, head first, quite rapidly, his body

being nearly horizontal and apparently rigid. He came in again, feet foremost, and we returned to the other room."

Upon the publication of this account by Lord Lindsay and Lord Adare, Dr. Carpenter pointed out in *Science* that there remained a third witness, Captain Wynn, who had not been heard from. "The single honest sceptic," remarked Dr. Carpenter, "declares that Mr. Home was sitting in his chair." The "honest sceptic" in question promptly proceeded to prove that Dr. Carpenter was a "dishonest sceptic" who had fabricated the statement in question. Captain Wynn promptly corroborated the evidence of the other witnesses, and added, "If you are not to believe the corroborated evidence of three unimpeached witnesses, there would be an end to all justice and courts of law."

An unbiased reader who studies the record of Home's séances will be forced, either to admit that supernormal phenomena took place, or to fall back on "complete scepticism as to the possibility of certifying facts by human testimony."

Among those who made a detailed study of Home's mediumship may be mentioned the eminent scientist, Sir William Crookes, who witnessed among other phenomena, a remarkable instance of Home's power of handling live coals.

IV

Sir William Crookes, or Professor Crookes as he then was, devoted himself during the years 1870-1874 to psychical research. Crookes was elected to the Presidency of the Royal Society, the Chemical Society, the British Association, and the Institution of Electrical Engineers. He received the greatest distinction for which scientists are eligible. He was a member of the Order of Merit, and he received the Copley Medal, and the Gold Medal from the French Academy of Sciences. Among his discoveries may be mentioned the discovery of the new chemical element "Thallium," and his invention of the radiometer. Professor Crookes carried out a series of experiments with

a remarkable young medium, Florence Cook by name, a girl of fifteen. On several occasions a figure gradually appeared, for a period which varied from twenty minutes to an hour of the medium going into a trance. This figure was built up out of the substance which is now known as ectoplasm. The apparition could move and talk, submitted to various tests, and behaved and looked exactly like a human being. It assumed the name of "Katie King," and was photographed by Professor Crookes on several occasions.

It was suggested that the medium and "Katie King" were one and the same person, a suggestion which Professor Crookes rebutted by stating that he had seen the medium Miss Cook and the apparition "Katie King" together at the same moment by the light of a phosphorus lamp.

Crookes' account of his experiments created a painful sensation in the scientific world. A small minority of scientists, fired by the true ideals of science, were encouraged to investigate the phenomena for themselves. Among these may be mentioned Wallace, the great naturalist, Lord Rayleigh, and the rising physicist, William Barrett. The great majority timorously declined to investigate phenomena which might endanger their simple faith in materialistic science. They behaved like those pious Bible Christians who refused to look at fossils lest their faith in Genesis might be disturbed.

V

Most of the phenomena of the séance room depend on a mysterious substance for which Professor Richet coined the word "ectoplasm."

The process of materialisation, whether partial or complete, differs only in minor detail with different mediums. The medium invariably goes into a trance, and gradually a formless mass begins to materialise. The early stages of this mass are often tangible but not visible. The experimenters are frequently touched as with invisible hands.

Then gradually the ectoplasm becomes visible. A cloudy, filmy patch seems to emerge from the body of the medium.

Professor Richet himself describes the gradual materialisation of this ectoplasmic substance. "A kind of liquid or pasty jelly emerges from the mouth or the breast of Marthe, which organises itself by degrees, acquiring the shape of a face or a limb. Under very good conditions of visibility I have seen this paste spread on my knee, and slowly take form so as to show the rudiment of the radius, the cubitus or metacarpal bone, whose increasing pressure I could feel on my knee. These materialisations are usually gradual, beginning by a rudimentary shape, complete forms and faces only appearing later on."

Carrington, a well-known conjurer, examined the famous medium Eusapia Palladino on behalf of the Society for Psychical Research. A hole was made in the roof of the little cabinet in which the materialisations took place, and it was the duty of one of the experimenters to observe the behaviour of Eusapia through this small opening. "On three different occasions," writes Carrington, "I saw strange projections emerging from Eusapia's body—once from the middle of her back and then receding into her body. These pseudopods were wrapped in the material of the curtain, so that their consistency cannot be determined."

Ectoplasm has now been studied under the most rigid test conditions by scientific investigators.

Many of the more important results have been secured at the *Institut Metapsychique* in Paris, a laboratory for the study of psychical phenomena, and thoroughly equipped with all the modern appliances for excluding fraud and for recording in an accurate and scientific manner the results obtained. This Institute has been recognised by the French Government as "of public utility."

My readers may be referred to *Clairvoyance and Materialisation*, a record of experiments by Dr. Gustave Geley. Dr. Geley was the first head of the *Institut Metapsychique*, and his book contains a very full record of what took place

in the Institute. The book is illustrated by photographs and cinematograph photographs of ectoplasmic materialisations.

It was at the *Institut Metapsychique* that the famous paraffin glove test was employed for the first time. This test was made by Professor Richet and Dr. Geley, and the first experiments took place with the Polish medium Kluski.

Dr. Geley, before the sitting began, prepared a bath of paraffin wax.

During the séance the "spirit" was requested to immerse his hands into the paraffin bath. The spirit obeyed, and the spirit hand emerged covered with a thin coating of paraffin, a fragile shell about the sixteenth of an inch in thickness.

It would, of course, be impossible for a human being to withdraw his hand from such a delicate paraffin shell without breaking it; for the hand could not pass through the narrow opening where the shell had solidified around the wrist.

The spirit then dematerialised its hand in the paraffin shell which was, therefore, left intact.

I use the expression "spirit" and "spirit hand" for the sake of convenience, though I am not a believer in the spiritist hypothesis. I am content to maintain that these paraffin gloves provide unanswerable proof of the existence of some strange force of which, at present, we know nothing, which enables the medium to build up simulacra of human forms, by some process which cannot be explained by fraud.

The thin paraffin shells were preserved and made permanent by filling them with plaster. The paraffin gloves have been submitted to professional moulders who declared that they could not reproduce these gloves by any process known to them. A professional moulder who wished to obtain a mould of a hand with bent fingers would make this mould in two sections, joining the sections together. The paraffin gloves show no trace of a join.

In many of these paraffin gloves the hands are closed, the thumbs bent and the finger-tips joined to the palm. A well-known scientist, who disbelieved in psychical phenomena, attempted to produce these paraffin gloves in his laboratory. The contrast is very striking between the swollen, shapeless shells which he produced and the delicate paraffin shells produced at the séance, shells which clearly show all the lines in the hand and which are perfect in their moulding.

The lines on the hands and the finger-prints on these paraffin moulds have been shown to be entirely distinct from the finger-prints either of the medium or of any of the sitters present at the séance. In order to prove that the paraffin shells were not manufactured outside and introduced surreptitiously into the séance room, Dr. Geley took the precaution of mixing cholesterin in the paraffin bath which he himself brought into the séance room. After the séance concluded, he tested the paraffin gloves and satisfied himself that they had been formed from the paraffin which had been treated with cholesterin.

These paraffin gloves can be seen in the Psychic Museum attached to the Psychic Bookshop in Victoria Street, London.

Such are the facts. It is, of course, our duty not to accept as proven these supernormal phenomena until we have failed decisively to discover some alternative and normal explanation for these strange happenings.

"To admit the reality of these phenomena," writes Professor Richet, "was to me an actual pain, but to ask a physiologist, a physicist, or a chemist to admit that a form that has a circulation of blood, warmth, and muscles that exhales carbonic acid, has weight, speaks and thinks, can issue from a human body, is to ask of him an intellectual effort that is really painful. Yes, it is absurd; but, no matter—it is true."

VI

The fact that the sittings usually, but by no means always, take place in the dark is suggestive of fraud, for all things being equal it is less easy to detect fraud in the dark than in the light.

Those who argue that because darkness facilitates fraud, all phenomena that takes place in the dark is due to fraud, are guilty of an elementary logical blunder. From the major premise "darkness facilitates fraud" and the minor premise "dishonest mediums demand darkness" no sound logician would draw the conclusion "therefore all phenomena which take place in the dark are due to fraud."

"The detrimental action of light on ectoplasmic forms is not surprising. Light is well known to be fatal to many micro-organisms, and seems even to hinder the organisation of primordial forms of life. Germs in process of development are usually shielded from its action, more or less, by the natural conditions. The early states of embryonic life take place in relative or complete darkness. One of the functions of chlorophyll in vegetation seems to be the protection of delicate tissues against light, and it is a common observation that vegetable growth takes place mainly at night.

"If light hinders the biologic process in the first stages of organic growth, considering that this process is very slow, it is easy to conceive that it should actually paralyse the same processes during materialisation, when the rapidity of vital action is greatly accelerated. The human embryo, for instance, requires weeks to be built up in the womb, shielded from light; in a séance a quasi-human being or a human organ is completely formed in a few seconds."¹

Darkness is not indispensable. The great medium David Home produced most of his phenomena in a good light. The sittings with "Eva C." took place in a red light. "Besides, all the sittings took place in a red light, so that

¹ *Clairvoyance and Materialisation*, by Dr. Gustave Geley. (Fisher Unwin.)

during the four years there was not a single dark séance. We began with a single lamp and ended with a six-lamp chandelier of more than one hundred candle-power."¹

It is, of course, easy to eliminate all possibility of fraud even when the séances take place in complete darkness. The séances should take place either in a special laboratory kept for such purposes, or in a room which has been thoroughly searched before the medium enters. The medium must be completely undressed and clothed in a garment belonging to the experimenters, and the medium must enter the room in company with the experimenters.

During the sitting it is essential that the medium's hands, not wrists, should be held by experimenters. A conjurer, however skilful, cannot produce effective leger-demain with his head or his feet. He needs his hands.

In the case of "EvaC." every conceivable precaution was taken to prevent fraud.

"In these experiments, which lasted over four years and were conducted with admirable care and patience, minute precautions were taken against fraud. At each séance the cabinet was closely searched. Eva was completely undressed, and, in presence of the experimenters, clothed in a close-fitting garment covering her from head to foot. Her head was covered by a veil of tulle sewn to the other garment. Her hair, armpits, nose, mouth, and knees were examined; and in some cases even examination *per rectum et vaginam* was resorted to. As the materialised substance frequently comes from her mouth, syrup of bilberries was administered, whose deep colouring powers are well known, but notwithstanding this the extruded forms were absolutely white. Experimental rigour was even pushed to the point of giving her an emetic before a séance."²

VII

No conjurer could produce phenomena under such conditions. Archdeacon Colley once offered £1000 to any

¹ *Phenomena of Materialisation*, Schrenk Notzing. (Kegan Paul.)

² *Thirty Years of Psychical Research*, by Professor C. Richet. (Collins.)

conjurer who could reproduce complete materialisations under the test conditions which had been observed at séances at which he had been present. Archdeacon Colley had been instituted by Bishop Colenzo, who had subsequently been accused of heresy.

The conjurer Maskelyne who was not very well versed in ecclesiastical niceties assumed that an Archdeacon who had been instituted by an heretical Bishop was open to attack as a bogus Archdeacon. He made some contemptuous statement to this effect, and was sued for libel by the Archdeacon. Maskelyne counter-sued the Archdeacon for £1000, claiming to have reproduced materialising phenomena under test conditions.

In spite of Victorian prejudice against spiritualism, Archdeacon Colley won his case. The jury, of course, were not asked to decide whether spiritualistic phenomena had occurred. They had to decide whether Maskelyne had fulfilled the conditions of the wager. The celebrated naturalist, Alfred Wallace, gave evidence on behalf of Archdeacon Colley, and assured the jury that the illusion produced by Maskelyne had not the least resemblance to materialisations which he had himself witnessed.

Warned by his father's experience, Captain Noel Maskelyne has wisely declined to accept a precisely similar challenge.

In April, 1929, the well-known Austrian medium Rudi Schneider paid a visit to England. Mr. Harry Price, the Honorary Director of the National Laboratory of Psychical Research, made a public offer of £1000 to any person, conjurer or otherwise, who could duplicate the Schneider phenomena under identical conditions provided that the conjurer in question was prepared to pay £1000 if he failed.

Not one conjurer dared to attempt to produce a single phenomenon under the stringent conditions of control imposed on the medium.

Mr. Price, I should add, had been an amateur conjurer himself since he was eight years of age, and had studied

the tricks of mediums for many years, and possesses the largest library of works on deceptive methods in existence.

In November, 1929, Mr. Price wrote a letter to Mr. Noel Maskelyne in these terms:

"I extend to you an invitation to come to the National Laboratory of Psychical Research (the time to be mutually arranged) and produce the following manifestations under conditions identical with those we have imposed upon Rudi:

(1) A steady mass of fog, smoke, or vapour is to appear at the opening of a pair of velvet curtains hanging in our séance room.

(2) From the cloud a human hand (or something resembling it) is to be produced. This 'hand' shall pick up and throw a handkerchief, after which both the 'hand' and the 'smoke' (I refrain from calling it teleplasm) shall disappear.

(3) The 'smoke' is to be produced again, and from it two arms (or foggy terminals—call them what you will) are to grow; then the two 'feelers' (or shall I call them pseudopods?) shall pick up a wastepaper basket and hold it above the heads of the sitters. All this is to take place in clear red lights.

(4) Lower the temperature of the cabinet as registered by Negretti & Zambra's instruments, produce cool breezes developing into a wind. (These manifestations have actually occurred with Rudi Schneider as a medium.)

"So much for the phenomena. Now as to yourself. Acting as medium you will be required to pant like a steam-engine throughout the experiment, and your pulse rate will have to read at least as high as 112 beats per minute.

"You will not be permitted to bring an accomplice. . . .

"If you can, under these conditions, produce the phenomena that I have specified, I shall then know one very important fact, viz., that the phenomena can be simulated by some method of *legerdemain*."¹

¹ *Evening Standard*, November 29th, 1929.

Mr. Maskelyne declined the challenge, and feebly replied by offering to pay £100 to Charing Cross Hospital "if Mr. Schneider can produce genuine phenomena under test conditions imposed by us."

This is a good example of conjurer's logic.

No spiritualist has ever claimed that supernormal phenomena can be produced under conditions dictated by a hostile sceptic. Mr. Maskelyne might, for instance, insist that ectoplasm should be produced in a crowded motorbus. The spiritualist claims that supernormal phenomena have occurred under conditions which exclude fraud, but he does not claim to duplicate these phenomena at will. He does not claim to possess full control over supernormal phenomena. The wind bloweth where it listeth, but we do not deny the existence of wind because meteorologists cannot produce a tornado at a moment's notice.

Psychical phenomena are like the wind. No medium and no spiritualist has ever claimed the power to produce these phenomena at will, and therefore the claims of spiritualists are entirely unaffected by the fact that no medium will accept Captain Maskelyne's challenge.

On the other hand, Captain Maskelyne claims that supernormal phenomena are, in effect, produced by *legerdemain*. If his contention is correct, it should obviously be possible for an expert to reproduce these phenomena under the identical conditions which were imposed on Schneider. Captain Maskelyne declined Mr. Price's challenge, from which it would seem reasonable to conclude either that these phenomena cannot be duplicated by *legerdemain*, or that Captain Maskelyne, who is recognised as a King of Magicians, is, in effect, a very inferior conjurer to mediums such as Eusapia Palladino, Eva C., or Rudi Schneider.

There is, of course, no evidence that Eusapia Palladino or any of the other leading mediums ever acquired the simplest feat of *legerdemain*, and it is difficult to suppose that these simple, and in many cases, half-educated people should have mastered the craft, which as Captain Maske-

lyne would be the first to admit, in its more advanced forms, requires years of study and practice.

The time has come when it is incumbent on leading conjurers, such as Mr. Maskelyne, to have the courage in common honesty to admit that they are powerless to reproduce by *legerdemain* the supernormal phenomena of the séance room.

VIII

We must not forget that though mediums have often been detected in fraud, on one famous occasion one of the greatest of conjurers was detected in cheating against that well-known American medium "Margery."

The facts are given by Mr. Malcolm Bird in his interesting book, *Margery the Medium*. Mr. Malcolm Bird was the former managing editor of the well-known paper, *The Scientific American*, which appointed a Committee to investigate the mediumship of "Margery." Houdini, who was invited to join this Committee, had a strong professional interest in exposing mediums. "Houdini is past fifty years old," writes Mr. Malcolm Bird,¹ "and he faces the necessity of building up something new to keep him among the headliners of his profession when, as must inevitably happen, he no longer has the physical resources for his fatiguing escape tricks. In building up a new stage personality as exposor of mediums, he *must* behave toward all mediums as he has towards Margery. He *must* assume in advance that the phenomena are fraudulent, *must* at all hazards make them so appear, *must* in every way put the idea across that he is the author of mediumistic exposures, infallible 'bad medicine' for mediums."

Before Houdini joined the Committee the phenomena were beginning to emerge in red lights, and it was suggested that the critical séances should be held under these conditions. Houdini absolutely refused to sit other than in total darkness. The Committee were much puzzled by his attitude, for nobody suspected that Houdini might find darkness a useful ally in his campaign against the medium.

¹ Houdini has since died.

Houdini insisted that Margery should be enclosed in what he, himself, described as "an absolutely fool-proof cage." This was a cage of his own invention. One of the phenomena which Margery was required to produce was the ringing of a bell-box some distance from the cage in question. Margery was alleged to be controlled by the spirit of her dead brother Walter, and on one occasion, Walter, who appears to have been a violent young man, attacked Houdini. "Houdini, have you got the mark just right? You think you're smart, don't you? How much are they paying you for stopping phenomena here?"

Walter then asked the investigators to examine the box. The box was accordingly examined, and tucked into the angle between the contact boards was found a rubber eraser, off the end of a pencil. "It did not make the bell wholly inoperative; but Comstock estimated that it required about four times the usual pressure to ring it."

Now Houdini had been the last person to touch the bell-box. The bell-box rang when he pressed it, and he reported nothing eccentric in its action. Mr. Bird continues: "Nobody was asked whether he had put the eraser there; nobody seemed to know just what to do next--except Houdini, who at once volunteered that he had not done it. No further evidence was ever got. That which I have cited shows obvious and clean-cut opportunity for Houdini to have placed the obstruction. The fact that the bell was not wholly out of action suggests that it was placed in a hurry, as by such a trick, and not carefully and at leisure. That, under the given conditions, Houdini *could* do what was done he would be the first to insist. No equal opportunity can be shown for anybody else. And in view of Houdini's failure to report difficulty in ringing the bell, we are entitled to some assumption that, when he made this "test," either the obstruction was not in place, or it was there and he knew it was there."

On a subsequent occasion Walter startled the company by calling down curses on Houdini's head on the ground

that he had inserted a ruler into the cage. The lights were turned up and a two-foot jointed ruler was found inside the cage. Such a ruler, of course, would have been useful for the production of fraudulent phenomena. Houdini, no doubt, intended to turn up the lights after the séance had started and insist on searching the cage. The discovery of the ruler would then have been hailed as a complete exposure of Margery; but "Margery" and "Walter" spoilt this pretty plan. Houdini having been thoroughly exposed, proceeded to publish an *Exposure of Margery*.

Of this "exposure" it is sufficient to say that not one of those members of the Committee who were alleged to be present endorsed Houdini's attack. The Committee among others included the eminent psychologist Professor McDougall. Moreover, the exposure produced no impression whatever on Mr. H. G. Wells and Professor Julian Huxley whose views about "Margery" have already been quoted in this chapter.

Neither fraud nor *legerdemain* can explain these phenomena. Nor does the hypothesis of collective hallucination carry us very far. Cameras and cinematographs do not suffer from hallucination. I admit, of course, that spirit photographs can easily be faked, but in the case of "Eva C." photographic plates were inserted by the experimenters themselves and were developed in their presence. Again, thermometers are not easily hypnotised and it is obvious that if a group of people sit together in a confined space, the temperature will normally rise. It is, however, an established fact that there is a sharp drop in temperature immediately preceding the manifestation of supernormal phenomena. An Australian scientist introduced into the séance room a barograph which was synchronised by a watch by means of which he recorded the precise moment at which the phenomena took place. The barograph recorded a steady rise in temperature between phenomena, and a sharp drop immediately preceding the manifestations.

These experiments were recorded in *Nature*.

Finally, the paraffin gloves which have been described above, are still in existence. No professional moulder has succeeded in reproducing them by normal methods, and unless we are to maintain that every visitor to the Psychic Museum suffers from hallucination, these gloves, which can be inspected by the reader of this book, completely dispose of the hallucination hypothesis.

IX

The sceptic often takes refuge in the statement that he is prepared to accept these phenomena when they can be reproduced at will. He believes in wireless because he can turn on his wireless set with the certainty that it will function. He will believe in ectoplasm when ectoplasm can be reproduced at will.

Scientists employed a precisely similar argument to justify their rejection of the popular belief in meteorites. We cannot reproduce a meteorite at will, yet none the less, we accept the fact that meteorites have fallen.

We cannot reproduce at will Shakespeare's Sonnets or the Dodo, yet we do not deny that the Sonnets were written by Shakespeare or that the Dodo existed.

There is, indeed, no *a priori* reason to suppose that mediumship must be either fraudulent or as consistent in its efficiency as a wireless set. Physical mediumship may be as rare as genius. We do not yet understand its laws, but it is perverse and irrational to insist that no facts shall be recognised as occurring until science can discover the laws responsible for their occurrence.

"To imagine," writes Professor Richet, "that all metapsychics are but illusion: to suppose that William Crookes, A. R. Wallace, Lombroso, Zölln, F. W. H. Myers, Oliver Lodge, Aksakoff, J. Ochorowicz, J. Maxwell Boutleroff, Du Prel, William James, Morselli, Botazzi, Bozzano, Flammarion, A. de Rochas, A. de Gramont, Shrenk-Notzing, and William Barrett were all, without exception, liars or imbeciles; it is to suppose that two hundred distinguished observers, less eminent, perhaps, but persons

of high and acute intelligence, were also liars or imbeciles."¹

X

Hitherto I have confined myself to discussing physical phenomena, such as materialisations and the movement of objects at a distance.

Subjective phenomena, which I now propose to discuss, are purely mental. The medium goes into a trance, and while in a trance professes to get into touch with a "control." The "control" acts as a medium in the other world. The spirits of the dead communicate through a control on their side just as we communicate through a medium on our side, the control and the medium acting like wireless operators who pass on the message between the living and the dead. Occasionally, the spirit speaks direct without employing a control.

Mrs. Leonard, who is one of the most famous of subjective mediums, is controlled by the spirit of a little girl who calls herself "Feda." I have had a sitting with Mrs. Leonard, and "Feda" struck me as a tiresome young person. I was not impressed by her deliberate lapses into the vocabulary of childhood. She had no difficulty with long words such as "hallucination," but every now and then she pretended to stumble over a very simple monosyllable. "Feda" has been engaged on this work for years, and it is high time she picked up a working knowledge of the English language. There appears to be no institution for backward children in the other world.

None the less, though the result of my own sitting with Mrs. Leonard was negative, some of her sitters have achieved amazing results through this medium.

Automatic writing is another method of getting into touch with spirits. Mr. Vale-Owen, for instance, sits down before a piece of paper. Very soon his hand begins to travel across the paper and starts writing. He does not consciously guide the pencil, the writing is automatic, and the

¹ *Thirty Years of Psychical Research*, by Professor C. Richet. (Collins.)

spirit is alleged to use Mr. Vale-Owen's hand just as "Feda" uses Mrs. Leonard's vocal chords.

Here again, I am bound to admit that having read the accounts of the other world, for which we are indebted to Mr. Vale-Owen's mediumship, I remain obstinately unconvinced that there is anything in these accounts which did not previously exist in Mr. Vale-Owen's subconscious self.

On the other hand, it is impossible to doubt that many mediums habitually display in trance condition a knowledge of facts of which they could have had no normal knowledge. Even conservative and old-fashioned scientists are beginning to admit that telepathy, at least, is a proven fact. Telepathy, the bare possibility of which was laughed out of court by Victorian scientists, is gratefully accepted by modern science as the only possible avenue of escape from a spiritist hypothesis.

Telepathy is not, as the sceptics seem to assume, an explanation, but merely a long Greek word which serves the same function as our old friend "x" in algebra.

The medium, according to this theory, taps the memories, not of the dead, but of the living, and reads the minds of the sitters (or even of absent people) by an unknown process for which the word "telepathy" has been provisionally adopted. To prove survival and to establish the identity of the spirit, it is essential to exclude all possibility of telepathy between the living from our tests.

Modern psychical researchers devote much thought to the problem of excluding telepathy. The successful tests, according to modern standards, must reveal knowledge of facts which are unknown either to the sitter or to the medium and, if possible, equally unknown to any living person.

An interesting and successful psychic experiment, expressly devised to exclude the possibility of telepathy, was recorded by Sir Arthur Conan Doyle in *The Times* (May 27th, 1930), written shortly before his death.

It was arranged that two groups should sit simultane-

ously, the first group in America, the second group in Venice. "Margery" was the medium in America and Valantine in Venice.

"The American group tore off from the calendar certain numbers, holding them face downwards so that neither he nor any of the group were allowed to see what the numbers were. They were placed inside an envelope which was sealed. Presently the room was darkened and Mr. Bond, acting upon instructions from the entranced medium, unsealed the envelope, took out three of the slips, one by one, leaving them for some minutes in the dark upturned upon the table. The three slips were then replaced in his pocket. This concluded the proceedings so far as the American group was concerned. At the conclusion the lights were turned up and the three numbers were taken. They proved to be three, five and ten. A letter was at once written to the Venice group stating the numbers. This letter crossed one from Venice written upon the same evening and giving the same numbers, which had been duly recorded by Valantine."

The experiment was repeated with similar success a few days later.

"The interest of the experiment," wrote Sir Arthur Conan Doyle, "lies in the fact that it rules out the idea of telepathy, since the numbers transmitted were unknown to any of the Boston group. The only alternative seems to lie in the spiritistic hypothesis which assumes an invisible intelligence, capable of manifesting at far distant points at approximately the same hour."

Some very interesting tests are described in a book, *Life beyond Death with Evidence*, by the Rev. Charles Drayton Thomas (Collins).

The spirit who co-operated with Mr. Thomas in these tests was alleged to be the spirit of his dead father. (I use the accepted terminology of Spiritualism as a matter of convenience, though I do not myself accept the spirit hypothesis.)

Of the many tests described in Mr. Thomas's book the

following may be taken as a fair average example, less striking than some, and more impressive than others.

The Book Test, about to be described, was not invented by Mr. Thomas.

The spirit of Mr. Thomas's father selected a reference from a book in a room which Mr. Thomas himself had never visited. This fact makes the test all the more convincing, as the success could not be ascribed to Mr. Thomas's unconscious memory of a book which he had at one time read in his own library.

The book referred to was in the house of an acquaintance living at some distance. "I wrote explaining matters," says Mr. Thomas, "and gave the description of the room, the particular shelf, the position occupied by the book upon that shelf, and the number of the page. The test message stated that on this page would be found a few words aptly describing *the purpose for which my father was working with me*. On receiving a reply, I learnt that the page in question contained the words, *To give light to them that sit in darkness and in the shadow of death*. Few sentences could more effectively summarise the purport of my father's remarks at this period about his object in working with me. For he often emphasised the need of evidence, sufficient in quality and quantity, to ensure that his speaking with me and his account of experiences in the life beyond would be recognised as something more than fanciful imaginings. He believed that a conviction of the reality of such communications as his would, for many people, dissipate uncertainty about a future life; and that for others, an acquaintance with his after-death experiences might remove, or at least greatly lessen, the fear of death."

The importance which we shall attach to tests of this description will, of course, depend entirely on the ratio of hits to misses. Fortunately, statistics are available which seem to dispose of the theory that successes of this type are only accounted for by chance.

The Society for Psychical Research has investigated

this problem of book tests and a full account is contained in the S.P.R. "Proceedings" for March 1923.

Sixty investigators undertook to search for fictitious book tests and to examine ten of their own books for three separate tests. As far as possible, these were held on exactly the same lines as the spiritualistic book tests, and similar topics were chosen.

They produced successful hits on 4·72 per cent cases, whereas the tests carried out with Mrs. Leonard as a medium scored no less than 36 per cent of successes.

It is possible to explain the book tests by the faculty of clairvoyance at a distance. The medium *may* be able to read the contents of a book in a library several miles away. No such theory, however, helps to explain the experiments with the daily Press, the description of which gives Mr. Thomas's book an assured place in the literature of psychical research, for these tests were invented, so he tells us, by the spirit of his father.

"Independence of telepathy from the sitter's mind has been proved by book tests; but might they not, one will ask, be somehow due to the medium's clairvoyance at a distance? My father apparently realised that this point required guarding, for he presently devised an ingenious extension of the book test idea, one which ruled out the medium's clairvoyance as completely as book tests had ruled out telepathy. This he did by means of what are now known as newspaper tests."

Mr. Thomas's sittings with Mrs. Leonard took place at an hour of the day long before the type of the London Press for the following day is normally set up. The spirit of Mr. Thomas's father visited the offices of *The Times* just before the sittings began. He made a note of various items of news, names of people, etc., which were to appear in the next issue of that paper, but which had not yet been set up in type.

"By employing a faculty which seems to involve some slight degree of prevision, he then ascertained the approximate position which these items would occupy when the

paper was set up and printed. This done, he was ready for my sitting, and soon after its commencement he transmitted, through Feda, the references which I was to verify the following morning by examination of the issue of some particular organ of the public Press.

"The simplest form of newspaper test was the statement that such and such a name would be found in a minutely described position in the morrow's *Times*."

The importance of this test consists in the fact that it not only excludes telepathy but also clairvoyance at a distance, for the reference to *The Times* was given before the page in question which was to confirm the reference had been actually set up in type.

Of the many examples of newspaper tests in Mr. Thomas's book I select the following. It contains a slight mistake, column 2 for column 1, but is otherwise impressive.

"November 11, 1921, at 3.25 p.m.

"In the tests for this date there was but one inaccuracy, although seven were given. This mistake looks like a slip of memory on my father's part; for Feda said column two, when actually the required words were found to be in column one. Feda's message was as follows:

'Column two, page one of *The Times*, a little way above half-way down see the name Dawson. He knew one Dawson very well; and close to that name is given a place which he connects with the Dawson whom he knew.'

"Just two inches above half-way down column *one* appears (in next day's *Times*) the 'Rev. Canon Dawson,' and on the line next above it is, 'St. Nicholas Church.' In the years 1882-5 my father resided at Ramsgate and his colleague, the Rev. R. G. Dawson, lived in Margate. The latter had the oversight of our church at St. Nicholas, a village some few miles distant."

"It was," writes Mr. Thomas, "my invariable custom to post a copy of these tests to the Society for Psychical

Research on the evening of the day on which they were given. They are there preserved for reference, and it can thus be certified that they were received by the Honorary Secretary on the morning of the day following each sitting."

This was a wise precaution, but Mr. Thomas's record of these tests would have been more impressive had he included in his book a statistical statement of his successes and failures prepared by the Secretary of the S.P.R., vouched for by him.

The newspaper tests, like the book tests, depend for their value on the ratio of successful to unsuccessful experiments, and unless this ratio can be proved to be far higher than the ratio obtainable by pure chance, they remain unconvincing.

Meanwhile, all we can say is that the evidence which Mr. Thomas supplies is interesting, but by no means conclusive.

For the sake of argument, however, let us assume that the book and newspaper tests have conclusively proved that in the course of a sitting supernormal knowledge is acquired, which in the case of the former cannot be explained by telepathy, and in the case of the latter cannot be explained either by telepathy or by clairvoyance at a distance. If we assume that telepathy and clairvoyance are excluded, must we deduce that communication with the dead is now an established fact? No, for we have no proof that the discarnate intelligences that represent themselves as the spirits of the dead are not clever impersonators of those spirits.

The Roman Catholics, for instance, believe that spiritualistic phenomena are produced by evil spirits. I ask the reader's indulgence for a quotation from an essay in which I expressed dissent from this view.

"Roman Catholics believe that psychical phenomena are the work of evil spirits. One man's saint is another man's devil; and as the spirits are clearly heretical, Rome has no option but to denounce them as Satanic. None the

less, these spirit guides, if they be devils, are very mild devils. One and all, they insist with monotonous equanimity that honesty is the best policy, that virtue is rewarded, that crime is punished, and that God rules supreme. The Roman Catholic hypothesis is only plausible if we assume that Lucifer, who fell through pride, has been condemned to a worse fate than any imagined by Dante or Milton, for I can conceive of no grimmer punishment than to be condemned to act as Mr. Vale-Owen's amanuensis."

Mr. Thomas bases his rejection of the Roman Catholic theory on the pragmatist test. "By their fruits ye shall know them."

"Multitudes confess that they have been turned thereby [by Spiritualism] from doubt to belief, from agnosticism to faith; in short, the religious instinct has been enriched and intensified and in no wise lessened. The fruit has been good. No one who is aware of the uplifting influence it may have proved in their lives will suggest that this is the work of deceiving spirits who desire to neutralise the influence of Jesus Christ, or to degrade man's thought and life. If evil powers were the source of these communications, they would be doing the work of God's ministering spirits and undermining the hold of evil on mankind."

This may be true, and yet it is difficult to resist the conclusion that our friends deteriorate very rapidly once they have reached the other world. The spirits seldom rise above the intellectual level of an intelligent child. They throw no new light on ethics or philosophy, and content themselves with repeating copybook maxims and simple applications therefrom. No new discovery in physics or mathematics, in art or in literature, can be proved to emanate from our spirit guides.

The spirits that communicate may not be evil spirits, but in so far as they suggest our dead friends, they resemble the mere husk of personality discarded by the dead, an afterglow rather than the flame of life itself. Even if we could prove that we had really established communication with the dead, we may merely prove to have suc-

ceeded in tapping their dreams, dreams which are still, perhaps, made up of earth-bound memories. This theory, indeed, would explain the vague, fitful, inconsequent nature of so many of these communications. If the dead remember their lives on earth, Spiritualism may well be the process of tapping their subconscious earth memories.

Spiritualists are anxious to persuade us that the spirit world in every sense of the term is a real world. It has its hills and valleys, its trees and houses, and the spirits themselves wear clothes. Some little time ago an eminent scientist suggested that the spirit body was an etheric body. The spirit world welcomed this suggestion from a great authority on the ether. "Feda," in spite of her girlishness, can chatter quite intelligently on the subject of the ether and etheric bodies. This fact throws new light on Spiritualism, for it seems that the earth-bound spirits are perhaps the most intelligent, and that "Feda" in the other world fulfils a useful rôle by communicating to the spirits the discoveries of earth-bound science. It is, at least, significant that no spirit discovered that he possessed an etheric body until scientists in this world began to explore the possibilities of the ether hypothesis.

The spirit world consists of dreamlike duplications of the real world. Spirits do not eat, and yet fruit trees grow in the spirit world. The spirits do not feel the cold and yet they wear clothes. They do not sleep, so we are assured, and yet they live in houses where they rest from toil. The spirits travel by an effort of the will and yet sometimes "add mechanical appliances to add variety." The spirits frequently take long walks because they enjoy walking, "not because it is necessary. I can float at will, but from habit I enjoy feeling my feet upon the ground. It will naturally be asked what it is that I walk upon; is the ground real or do I only think it? There certainly is ground, and to me it is solid, as solid as is the earth's surface to you, and it resists the pressure of my feet."

Others may find this convincing, but I do not. If the other world is real, the realities of this life will not be

duplicated merely for the sake of duplication. If there are apple trees, as we are assured, in the next world, there must be somebody to eat those apples. If clothes are worn, they must be worn by people who would otherwise feel the cold, not because "it is a habit of thought to think of oneself in clothes." If there be another world at all, it is either entirely different in every aspect from this world or it resembles this world not merely in a dreamlike duplication of mountains, lakes, rivers, houses and clothes, but also in the close alliance of form and function.

Meanwhile, the spirits, if they wish to carry conviction, must enrich the messages from the other world by some few touches at least which do not bear the obvious hallmark of subconscious invention.

Yet, when we have made all possible allowances for the puerility of so many spiritualistic messages, when we have discounted the possibilities of fraud and hallucination, there still remains a bewildering residue of supernormal facts. I envy alike the spiritualists and their hard-headed (and perhaps pig-headed) opponents. They, at least, have achieved a satisfactory "gnosis," whereas I remain in a condition of puzzled and painful agnosticism.

I do not hope to succeed where a man like William James, who devoted twenty-five years of his life to this problem, was forced to admit ultimate failure. His provisional solution to the great mystery seems to me perhaps as plausible as any which have yet been put forward. "My own dramatic sense," he writes, "tends instinctively to picture the situation as an interaction between slumbering faculties in the automatist's mind and a cosmic environment of *other consciousness* of some sort which is able to work upon them. If there were in the universe a lot of diffuse sob-stuff, unable of itself to get into consistent personal form, or to take permanent possession of an organism, yet always craving to do so, it might get its head into the air, parasitically, so to speak, by profiting by weak spots in the armour of human minds, and slipping in and stirring up there the sleeping tendency to personate. It

would induce habits in the subconscious region of the mind if used thus, and would seek above all things to prolong its social opportunities by making itself agreeable and plausible. It would drag stray scraps of truth with it from the wider environment, but would betray its mental inferiority by knowing little how to weave them into any important or significant story."

In conclusion, I must offer the reader an apology for not suggesting a definite solution. I am convinced that supernormal phenomena occur, but I am an agnostic so far as all solutions are concerned. Psychical research, I believe, is still in its infancy. It may well be that the milestones on the journey towards the final solution correspond, as William James himself believed, not to years but to centuries.

CHAPTER XIX

THE REVOLUTION IN MODERN SCIENCE

I

IN this chapter I am concerned with the modern scientific revolution in so far as it affects the ultimate problems of religion. For a comprehensive survey of the modern scientific outlook in all its aspects, I must refer the reader to *The Nature of the Physical World*, by A. S. Eddington, F.R.S., Plumian Professor of Astronomy in the University of Cambridge (Cambridge University Press). Sir Arthur Eddington is not only one of the foremost scientists of the day, but he is also a master of exposition. Relativity is not an easy subject, but even the unmathematical will be able to read *The Nature of the Physical World* with interest. Every page is illuminated by flashes of delightful humour which encourage those who are baffled by the intricacies of the subject to attempt the next stile.

The Bases of Modern Science, by J. W. M. Sullivan (Ernest Benn, Ltd.), is another excellent book, written in a most agreeable style by a great authority on the history of science.

The publication of *The Nature of the Physical World*, by Sir Arthur Eddington, caused as much consternation among rationalists, as the appearance of *The Origin of Species* provoked among mid-Victorian bishops.

It was bad enough that a scientist of European standing should assert that modern scientific discoveries have banished "strict causality," and with strict causality the very foundations of Victorian materialism, from the material world. It was intolerable that Sir Arthur Eddington

should proceed to prove that Naturalism is bankrupt, and Supernaturalism by far the most plausible explanation of the great riddle.

There is a touch of wistful bravado in the *cri de cœur* of Mr. Cohen, the Editor of *The Freethinker*. "I have been knocking down God Almighty for thirty years. You cannot expect that after knocking down God Almighty I am going to jib at Professor Eddington." Mr. Cohen may not jib at Professor Eddington, but the man in the street, who is far too easily influenced by the pronouncements of the scientists, is beginning to jib at Mr. Cohen.

The man in the street is, of course, less impressed by the merits of an argument than by the credentials of the arguer. He would have ignored Eddington's views had they been expressed by a bishop, but he sits up and takes notice when a prominent scientist attacks the creed associated with Victorian science.

In this respect there is little to choose between the attitude of the man in the street and the attitude of the average churchman. The churches are more infected than they might care to confess by a superstitious reverence for the pronouncements of scientists, not only on science, but on all other subjects as well. Sir Arthur Eddington's views on religion are of great interest, not because he is a scientist with a European reputation, but because he is a very able philosopher.

Compare Huxley's attempt to prove the all-sufficiency of Naturalism as an explanation of both physical and mental phenomena, and Eddington's brilliant attack on Naturalism, and you will find yourself contrasting not only their scientific attainments, but also their philosophic acuteness. You may be unconvinced by Eddington, but even Mr. Cohen would have an uneasy feeling that Huxley ought to have anticipated Eddington's line of attack. Eddington's argument owes nothing, beyond an occasional illustration, to science. He is more convincing than Huxley, not because he is a better scientist, but because he is a more profound and a more logical philosopher.

It is undignified of churchmen to adopt an attitude of self-congratulation if a distinguished scientist appears as a defender of the Faith. It would be far more fitting for the Churches to indite a sonorous letter of congratulation to the Royal Society for such welcome evidence of the return of science to sanity.

It is a great mistake to associate enduring truths with the passing scientific fashion of the moment. "Strict causality," writes Sir Arthur Eddington, "is abandoned in the material world. Our ideas of the controlling laws are in process of reconstruction and it is not possible to predict what kind of form they will ultimately take; but all the indications are that strict causality has dropped out permanently. . . . If our expectations should prove well founded that 1927 has seen the final overthrow of strict causality by Heisenberg, Bohr, Born and others, the year will certainly rank as one of the greatest epochs in the development of scientific philosophy."

I, for one, am not prepared to base my faith in Free-will on the researches of Messrs. Heisenberg, Born and others.

Sir Arthur Eddington tells us that "his apprehension that the fourth version of the new quantum theory should appear before the lectures were delivered was not fulfilled." None the less, I think theologians should refrain from basing their apologetics on the third version of the quantum theory. It is a great mistake to hitch one's waggon to a shooting star.

II

The old guard of Victorian materialists have long regarded science as their natural ally, and consequently resented Sir Arthur Eddington's attack as a treacherous onslaught. "Et tu Brute" they cry with poignant sincerity. We are all creatures of habit, and the free-thinker who is protected by the routine of fixed thought from the painful necessity of thinking freely, has a legitimate grievance against Sir Arthur Eddington. It is, for instance, extremely

trying to be forced to revise those old-fashioned sermons on cosmic humility which enjoyed such continuous popularity among the more devout rationalists. "The Medieval Christian," so ran the simple tale, "lived in a small and friendly universe of which the earth was the centre and the pivot. Man was Lord of Creation, the sun shone to warm him, and the earth was created to serve as his dwelling-place during that brief period of probation in which his eternal destiny was decided."

"Modern Science," continues the rationalist, "has shattered this snug cosmogony. Science teaches that we are the inhabitants of an insignificant planet revolving round an insignificant star. The universe is doubtless full of countless solar systems, many of which are far more splendid than our own. Science forbids us to assume that in all this vast universe our planet has been signalled out as the home of intelligent beings.

"The realisation of this fact," he concludes, "should fill our minds with awe, and inspire us with that true humility which it is the mission of science to promote. The Christian cosmogony belongs to a primitive stage in human development, and the creeds which are based on that outworn cosmogony cannot long survive the attacks of science. Science like a glorious sun is busily engaged in dispelling the clouds of outworn superstition, etc. etc." That sort of thing wrote itself, which was very restful.

It must be painful for Mr. Cohen to realise that modern science confirms the cosmogony of the medieval Christian.

Sir Arthur Eddington, who speaks with unrivalled authority as an astronomer, assures us that a solar system is a freak which could only be formed if a very unusual accident occurs at a particular stage of condensation. The accident in question must have been the close approach of another star, which by tidal distortion caused the sun to spurt out filaments of matter which condensed to form planets. "Even in the long life of the star," he continues, "encounters of this kind must be extremely rare. The density of distribution of stars in space has been compared

to that of twenty tennis-balls roaming the whole interior of the earth. The accident that gave birth to the solar system may be compared to the casual approach of two of these balls within a few yards of each other. The data are too vague to give any definite estimate of the odds against this occurrence, but I should judge that perhaps not one in a hundred millions of stars can have undergone this experience in the right stage and conditions to result in the formation of a system of planets." And he adds, "I feel inclined to claim that *at the present time* our race is supreme; and not one of the profusion of stars in their myriad clusters looks down on scenes comparable to those which are passing beneath the rays of the sun."

Cosmic humility must, therefore, give place to cosmic pride. So far, so good. This *volte face* of science will encourage those who share Mr. Belloc's belief that they may yet live "until that perhaps immediate day when the fantastic figures of astronomy will burst and the stars will be at reasonable distances again: as they are even now to a friend of mine who estimates the sun at twelve miles, the moon at twenty, and all the stars at a common distance (about a hundred miles) from the earth; and, firm in this faith, is as happy as one can be in this world."

III

The Victorian view of the atom has shared the fate of Victorian cosmogony. I am sorry to see the atom go. The Victorian atom was a friendly, concrete little fellow which I much prefer to the shadowy mists of unintelligible symbols which have replaced him.

Thought was considered to be a by-product produced by the interplay of atoms in the brain. "It was," as Sir Arthur Eddington has pointed out, "the boast of the Victorian physicist that he would not claim to understand a thing until he could make a model of it; and by a model he meant something constructed by levers, geared wheels, squirts or other appliances familiar to an engineer."

A material brain obviously suggested a ready-made

model of the mind. "And being a model, it was for them" (the Victorian physicists) "the full explanation of the mind. A mechanism of concrete particles, like the billiard-ball atoms of the brain, was their idea of an explanation."

The concrete model has disappeared from modern physics. The modern physicist does not try to explain the æther or the electron "in terms of billiard-balls or fly-wheels or anything concrete; he will point instead to a number of symbols and a set of mathematical equations which they satisfy. What do the symbols stand for? The mysterious reply is given that physics is indifferent to that; it has no means of probing beneath the symbolism. To understand the phenomena of the physical world it is necessary to know the equations which the symbols obey but not the nature of that which is being symbolised." And here it is necessary to insert a warning note. There are people who seem to think that the dissolution of the atom from a small billiard-ball into a shadowy mist of mathematical symbols strengthens the case against materialism. Of course, they are wrong. The arguments for and against materialism are entirely unaffected by the nature of matter. The essence of materialism is the belief, not that matter is necessarily solid, but that there is no fundamental distinction between mental and physical phenomena. Science is metrical knowledge and the materialistic fallacy consists in the assumption that all knowledge is ultimately metrical. The argument between the materialist and his opponent is entirely unaffected by our view as to the nature of the atom, the æther or the electron. The only important effect of the new outlook of physics on the religious problem is, as Sir Arthur Eddington observes, "that we are no longer tempted to condemn the spiritual aspects of our nature as illusory because of their lack of concreteness. We have travelled far from the standpoint which identifies the real with the concrete."

Mr. J. W. N. Sullivan, one of the most attractive of modern writers on science, contributed on April 13th, 1930, to the *Observer* a profoundly interesting review on

the present outlook of science. He began by alluding to the disconcerting fact that the actual status of physical science is a matter of dispute among scientists themselves who are by no means agreed as to the real aim and character of science. In order to throw a little light on this problem Mr. Sullivan interviewed the actual creators of the quantum and relativity theories of Professors Planck and Einstein, and also discussed these theories with Professor Schrödinger, a leading authority on the new views of matter.

Professor Schrödinger was convinced that something like free will was the basis of all natural phenomena. Planck and Einstein were emphatic in rejecting "the free-will theory of the universe," and apparently on this point Mr. Sullivan found their personalities more convincing than their arguments. He says, "These men possess a sort of scientific wisdom which often cannot be supported by reasoned arguments, but which is, nevertheless, pretty well infallible. Einstein, in one of his most interesting remarks, acknowledged that some of his scientific judgments are based, not on reason, but on feelings." It is interesting to observe Newman's "illative sense" turning up again, this time not in support of theological, but of scientific faith.

Planck then proceeded to develop the interesting theme that science "is a constructed work of art, expressing a certain side of man's nature. Another side is expressed in art and religion." Sullivan objected that science differs from art in that science gives us a knowledge of objective reality. Professor Planck promptly countered by asking what reason Mr. Sullivan had to suppose that "art and religion did not give us such knowledge." Science is an art, he insisted, and the fact that it also gives us "objective knowledge" is an indication that art and religion also do so.

Einstein went even further than Planck in insisting on the affinities between science and religion. Mr. Sullivan concludes his profoundly interesting article with the

reminder that modern science has entirely disowned Victorian materialism.

"In the new universe, it appears, our religious insight is granted as great validity as our scientific insight. Indeed, in the opinion of the greatest creator of them all, our religious insight is the source and guide of our scientific insight."

CHAPTER XX

THE LIMITATIONS OF THE SPECIALIST

I

A MEDIEVAL scholar could acquire a deserved reputation as an authority on almost every subject included in the university curriculum, but every succeeding century has added to the accumulation of human knowledge with the result that scholarship is tending to become more and more specialised. A modern historian, for instance, would feel very well satisfied if he was treated as an expert on the history of a particular country during a century.

The power of the specialist increases with every addition to human knowledge, for it becomes increasingly difficult to keep pace with modern discoveries, and increasingly tempting to save oneself the trouble of forming an opinion by accepting second-hand the verdict of a recognised expert.

It is only in theology that the amateur still feels free to air his views. Our scientists would be shocked if a bishop held forth on relativity, and would be startled if the views of a scientist on the religious implications of some scientific theory were challenged on the grounds that he was not a doctor of divinity.

The position, so far as the relations between religion and science are concerned, is the exact reverse of the medieval. In the Middle Ages science was regarded much as theology is regarded to-day, as the natural playground for the amateur, and theology as a subject reserved for experts.

The medieval theologian was a specialist whose opinions no amateur would have dared to question. Indeed, no man who was not trained in dialectics and who had not mastered the technical vocabulary of scholastic philosophy could possibly have understood, much less have taken part in, a medieval debate. Moreover, the arguments of the expert could, in the last resource, be reinforced by the stake.

The relative positions of science and theology are reversed in the modern world. The amateur is warned off scientific research but encouraged to express his opinions on theological problems, once regarded as the province of the expert.

The *Daily Mail* would scarcely invite Mr. Arnold Bennett, Miss Rebecca West, Mr. Owen Nares and Mr. A. P. F. Chapman to express their considered opinion on Einstein's theory of space-time, but the Editor would not hesitate to invite these distinguished people to contribute to the popular symposiums, which are a regular feature of the Press, on the immortality of the soul and the efficacy of prayer.

It would be pleasant to represent this as a spirited protest against the excessive tyranny of theological experts, but it would, I fear, be idle to pretend that the Editor argues in some such fashion as this: "I know, of course, that the Bishop of Birmingham is a great authority on prayer. He has been praying, on and off, for a great many years and has done valuable research work on this subject. But I refuse to be browbeaten by the specialists. Prayer is one of those branches of science on which the man in the street has as much right to express his opinion as the Bishop of Birmingham."

It is not, I fear, arguments such as these which account for the greater importance attached to the views of religious amateurs than to the views of the amateur in science.

II

On the general relations between amateurs and specialists, Mr. Chesterton has made some very shrewd observations. He writes as follows:

"I did not venture upon guesses and generalizations about history without considering somewhat seriously the problem which it raises, touching the inevitable inferiority of the amateur to the specialist. It seems to me rather a difficult problem with difficulties for the specialist as well as the amateur. My critic has complimented me with a comparison to Goldsmith, and certainly there is more real English history in ten lines of *The Deserted Village* than in the whole of Hume. But it is the very depth and darkness of my ignorance that discloses the difficulty. I am willing to believe that not only Mr. Coulton but every other man I meet in Cambridge knows much more than I do. But, in that case, how inconvenient and incalculable must be my course and progress through the Cambridge streets. I must become a modernist after meeting one man, a medievalist after meeting the next. The man in the street must be wholly at the mercy of an academic priesthood. When the priests quarrel, he cannot even cling to the most learned; for he cannot know which is the most learned without being more learned than all of them. And as there are specialists about everything, it is impossible for any ordinary person to form any impression about anything. Even a Protestant priesthood will hardly demand so complete a surrender of private judgment. I have reflected; and I think I see the place of the amateur.

"The obscure things, the details, and disputed points, the great scholar can always see, and note better than we can. It is the obvious things that he cannot see. I do not say this in mere depreciation; I think it is really inseparable from that concentrated research to which the world owes so much. It is the truth in the traditional picture of the absent-minded professor who remains gazing at a fossil or a Roman coin and fails to observe external objects, such

as a house on fire, a revolution, an escaped elephant putting its head through the skylight, and similar things. Mr. Coulton's view of history shows the same limitations; and it is precisely because I am so much less learned than he that it is my privilege to lead him through common ways, pointing out elephants and other enormous objects. For instance, inferior as I may be about information about the medieval world, I have as much right as anyone else to form impressions of the modern world. And I can hardly trust myself blindly to one who really seems to believe (as does Mr. Coulton) that the field of 'science' is free from journalistic adventures, amateur experiments, quacks and charlatans, even as this Chesterton."

Samuel Butler would have endorsed, with enthusiasm, Mr. Chesterton's brilliant defence of the amateur, for Butler admitted frankly that he had made no original experiments and that he had taken most of the facts at second-hand. An architect, he explained, does not quarry his own bricks. "If the facts are sound," he wrote, "how can it matter whether A. or B. collected them? If Professor Huxley, for example, has made a series of original observations (not that I know of his having done so), why am I to make them over again? What are fact collectors worth if the fact co-ordinators may not rely upon them?"

The whole quarrel between the specialist and the amateur turns on the relative value of fact co-ordinating and fact collecting and on the claim of the amateur to co-ordinate facts which others have collected.

Samuel Butler was not a naturalist. He was a fact co-ordinator rather than a fact collector. He proved himself to be a brilliant critic of the interpretation which Darwin placed upon those facts which Darwin collected.

Every age has its Butler, and the Butler of our own day would appear to be Commander Bernard Acworth. Commander Acworth, like Butler, is a fact co-ordinator rather than a fact collector. "It must be acknowledged," he writes, "that the author's knowledge of the curiosities

of bird life have been in great measure derived from the patient and brilliant observation of famous ornithologists." He resembles Butler not only in the brilliance of his destructive criticism and in the creative originality of his constructive criticism, but also in the intemperance of his attacks on distinguished scientists.

Commander Acworth, in his book *This Bondage* (John Murray), was one of the first to enunciate, and certainly the first fully to appreciate, the importance of the law which he describes as the first law of currents. "No bird and no machine can experience any pressure from the movement of the medium in which it is supported and operating."

He quotes many passages from distinguished scientists who fall into the error of supposing that a bird in flight *feels* the wind. A bird in flight is, of course, *affected* by the wind, delayed by a head wind and helped by a following wind, but in so far as its sensations are concerned, storm and calm are much the same thing. From this law Commander Acworth had deduced a fascinating theory of bird migration.

Here is a characteristic extract from the writing of an eminent scientist: "Thus the young eels or elvers must swim straight upstream, for their bodies automatically adjust themselves to have equal pressure on both sides."

"This statement," writes Commander Acworth, "is a mere repetition of the innumerable fallacies contained in 'scientific' treatises on flight, with water substituted for air. A fish in a current, like a submarine in a current or a bird in a current, can experience no pressure from the current in which it is operating, the pressure on the sides of the fish being equal, whatever the course of the fish relative to the direction of the current may be."

Commander Acworth's revolutionary explanation of bird migration is based, partly on the first law of currents, which I have already quoted, partly on the second law of currents, with which I need not trouble the reader, and partly on the fact, which is accepted as such by the over-

whelming majority of ornithologists, that birds and insects have an inherent power to sense and aim at a given spot in space, "this sense of exact directing being the sole and automatic, but at the same time amply sufficient guide in their navigation."

From these simple, but apparently indisputable premises, Commander Acworth proceeds to develop very persuasively his most fascinating argument. He regards birds and insects as mere parasites of the air. Their movements, including migration, being determined exclusively by the movements of the prevailing winds.

Once we are prepared to admit that the bird is a mere parasite of the wind, Commander Acworth's explanation of the desertion of nests, the arrival of male migrants before the female, and the system of mating, becomes almost irresistible.

Commander Acworth also advances strong arguments for believing that the recognition of landmarks plays no part whatever in "migration," and that migration itself is not migration at all in the objective sense, but is only a seasonal drift in which there is no evidence of intelligent aim on the part of the bird.

The book was virtually boycotted by the scientific Press, but enjoyed a magnificent reception in the lay Press. Competent laymen pointed out that Commander Acworth's premises appeared to be unassailable, and assumed that the conclusions which he deduced from those premises, conclusions which, if correct, would radically revolutionise current ornithology, would either be accepted or refuted by scientists. The scientists, however, adopted much the same tactics as those which enjoyed temporary success in the case of Samuel Butler.

There were honourable exceptions. Mr. T. A. Coward, one of the leading ornithologists of the world, reviewed the book in *The Manchester Guardian*, and described it as "a really remarkable book—a direct challenge soundly reasoned, to generally accepted ideas about flight, especially migratory flight of birds, insects, and indeed

anything, including aircraft, which moves in a single moving medium."

Thanks very largely to the persistent propaganda of an admirer of Commander Acworth's books, a few belated reviews had begun to creep into the bird magazines more than a year after the book had appeared.

Eighteen months after the book appeared our leading scientific paper, *Nature*, which had been criticised in another periodical for failing to notice Commander Acworth's book, attempted to dispose of his arguments by means of a foolish dialogue between a Mr. A. and a Mr. B., who devoted between them five short paragraphs to the Commander's theories.

"I have had the uncomfortable feeling," says Mr. A., "that the author had a few axes to grind." The old game. If you cannot refute an argument, you discount the argument on the ground of bias. Mr. B. then continues, "With regard to the effect of wind velocity on the flight of birds, which is ostensibly the main purpose of the book, I feel unkind enough to say that the author has discovered —somewhat belatedly—the parallelogram of velocities and is anxious to tell the world about it. He should have confined himself to that, for, as he justly points out, some naturalists talk a lot of nonsense on the subject."

The passage which I have quoted from a very short review contains the only fraction of that review which could conceivably be described as a criticism of Commander Acworth's theories.

Commander Acworth may have discovered the parallelogram of velocities "somewhat belatedly," but he has no difficulty in showing that practically every scientist and ornithologist has failed to apply this law to the phenomena of bird flight. Commander Acworth is not in the least anxious to tell the world about "the parallelogram of velocities," but he has every right to publish his brilliant applications of that law to the phenomena of bird flight. *Nature* admits that "some naturalists talk a lot of nonsense on the subject," but *Nature* discreetly omits to mention

that among the naturalists whom Commander Acworth has convicted of ignorance on this point are men with a European reputation such as Professor Patten and Professor J. A. Thomson.

It would have been more to the point if *Nature* instead of grinding the scientific axe had attempted to meet argument by argument rather than by sneers. A periodical which regards itself merely as the mouth-piece of organised scientific opinion would, perhaps, be well advised to dismiss a brilliant amateur critic with a few sneers, but if *Nature* represents, not only scientists, but science, it has no business to treat in this fashion a book to which Mr. Coward, one of our leading ornithologists, paid the glowing tribute quoted above.

In Butler's case, the scientists who boycotted his books did not disdain to borrow from him without acknowledgement to his ideas. It will be interesting to see whether Commander Acworth's theory of bird migration is quietly adopted without reference to the author of those theories.

Professor Julian Huxley appears to have been impressed by Commander Acworth's views. If this is the case, I hope that he will prove more generous to Commander Acworth than his grandfather proved to Samuel Butler. This support would be welcome and valuable.

In an article on the tsetse fly, Professor Julian Huxley wrote as follows:

"The tsetse fly is painted with three spots of paint, whose position and colour indicate the place, day and hour of its capture, and then released. By this means we shall learn how far and how quickly tsetse flies stray from one locality to another, and whether they behave differently in different kind of bush and different kind of weather."

Commander Acworth immediately replied, pointing out that a tsetse fly on the wing, like a bird, an aeroplane or an airship, "is absolutely parasitical to the air in and on which it is borne. Accurate observation of the time taken between two spots cannot surely, therefore, give any information of the insect's own flight capacity, the speed and course of

the insect's passage being the product of the insect's own proper speed and course in dead still air, and the full speed and direction of the wind or breeze prevailing at the time of the passage. From this it follows that the insect's apparent behaviour in differing wind conditions will be the exact measure of those wind conditions. The insect, in fact, is a constant, and the prevailing conditions provide the inconstant factor."

Professor Julian Huxley, following the family tradition as far as the relations between scientists and amateurs are concerned, did not deign to reply, but he is reported to have said a little later, on the wireless, that "all a bird cares about and all it requires is the right object in the right place," an excellent summary of the one assumption on which Commander Acworth's theories are based. (The laws of flight are, of course, not an assumption, but laws in the proper sense of that term.)

IV

Books like Butler's *Life and Habit*, and Acworth's *This Bondage* are good for the soul. They remind us that research is not the equivalent of invention, and that a State cannot supply discovery by the simple process of subsidising professional scientists.

"Of all forms of enterprise," writes Mr. A. H. Pollen, "that which is the most wholly personal is the gift of suddenly perceiving what is hidden from other men. It is this rare gift that we recognise to be the peculiarity of those pioneers in discovery and invention who are the true authors of modern progress."

Watt, who invented the steam-engine, was an artisan. It was a veterinary surgeon who discovered pneumatic tyres. Browning, who invented automatic weapons, was the son of a gunsmith. At the age of thirteen he made his first gun out of the scrap-iron in his father's workshop. De Saussure has been called with justice the father of modern geology. In the course of his mountain wanderings he must often have seen erratic boulders and moraines far beyond the

limits of existing glaciers. Yet he never drew the obvious conclusions that glaciers must at one time have extended many miles beyond their present limits.

Agassiz and Charpentier, great naturalists and great observers, also missed the significance of these signposts of past glacial ages.

A simple chamois hunter, Perrandier by name, observed a block of granite resting on limestone in the neighbourhood of Neuchâtel. Granite cannot grow out of limestone like a mushroom, and Perrandier accordingly deduced that the granite must at one time have been carried to Neuchâtel by a glacier. From which it followed that glaciers must at one time have covered the whole of Switzerland. Perrandier was, therefore, the discoverer of the glacial epoch of the past.

Military science tells the same tale. A civilian called Bloch foretold some years before the Great War many of the more important developments of war, notably the immobilisation of armies by the effectiveness of modern weapons. Bloch was a fact co-ordinator. Those who have read his book, and also the reminiscences of the late Lord French, must have been impressed by the artless fashion in which Lord French records the fact that he was taken completely by surprise again and again by aspects of the war which Bloch had foretold with complete accuracy.

It is, indeed, strange that the prestige of the expert survives the Great War. Our financial experts were confident that Europe could not stand the strain of a Great War for six months.

Most of our military experts shared this view. Indeed, the fact that Kitchener actually thought that the war might last for three years is still referred to as a triumph of pre-science, as indeed it was—for an expert.

The expert diplomatists . . . but why continue?

who succeeded in persuading the public that they were not professional politicians. Public trial by jury, that is by amateurs, has been the rule in our country from the earliest times, and this essentially English institution survived in England at a time when trial by jury was disappearing in other countries.

We are prepared to accept without criticism the considered opinion of experts on the things that do not greatly matter, the distance of a star or the age of a fossil. But on the greater issues we put our experts in the witness-box and we entrust the decision to twelve plain citizens.

In a murder trial, where poisoning is alleged, experts are called both for the prosecution and for the defence to give their expert views, not only on the question as to whether death was due to poisoning, but also on the amount of poison administered, the number of times it was administered, and the time that elapsed before the fatal dose and death.

Experts are the fact collectors, but the task of co-ordinating the facts which they have collected are left to the jury.

In other words, when a man's life is at stake, we put the experts in the witness-box and leave the decision to the amateur.

Few of us will be called to serve on juries in murder trials, but we have, one and all, to render a verdict on the great question *Utrum Deus sit*. On that issue, let us hear what the experts have to say by all means, but let us keep them in their proper place—the witness-box.

VI

Samuel Butler once remarked that he wrote *Life and Habit* "to place the distrust of science on a scientific basis." There is no more reason to distrust science than the multiplication table, but there is good reason to distrust organised scientific opinion.

The scientific expert has his value, but it is unhealthy for the expert and demoralising for the public for his

authority to be accepted with uncritical respect. Organised Science is gradually usurping the position which was once held by the Church. Scientists are beginning to assume that their pronouncements on religious or political or social problems deserve a respect greater than that accorded to the view of the non-scientific. "I do not think," said Lord Rayleigh in his Presidential Address to the British Association, "that the scientific worker has a claim superior to that of other people to assume the attitude of a prophet. In his heart he knows that underneath the theories he constructs there lie contradictions which he cannot reconcile."

I am not sure that it would be much pleasanter to be governed by organised science than by organised religion. It is an illusion to suppose that there is a natural alliance between science and democracy. On the contrary, science encourages in its prophets an attitude of aristocratic aloofness. "I have not very much use for people," writes Professor J. B. S. Haldane, "who are not in touch with the invisible world. At best they are good animals, and too often not even that." "This world and its future," writes Mr. H. G. Wells, "is not for feeble folk any more than it is for selfish folk. It is not for the multitude but for the best. The best of to-day will be the commonplace of to-morrow" (a view, by the way, for which there is no scientific evidence whatever). "If I am something of a social leveller it is not because I want to give silly people a good time, but because I want to make opportunity universal, and not miss out one single being who is worth while."

"Let the Lord God be praised in *all* his creatures," said St. Francis, and I am inclined to think that I should feel more comfortable in the world of St. Francis than in a world controlled by Mr. Wells.

"In my youth," wrote Horace Walpole, "philosophers were eager to ascribe every uncommon discovery to the deluge; now it is the fashion to solve every appearance by conflagrations. . . . I am a great sceptic about human reasonings; they predominate only for a time like other

moral fashions, and are so often exploded after the mode is passed, that I hold them little serious, though they called themselves wisdom. How many have I lived to see established and confuted!"

Horace Walpole gives a long list of the scientific dogmas of his own time all of which have been quietly dropped since Walpole's day. I sometimes wonder whether modern science will make much the same impression upon our descendants a hundred and fifty years hence as the science of Walpole's day makes on us.

One thing is certain. Very clever men are capable of talking very great nonsense.

The Victorian heresy itself might be described, as Professor Broad has described "Behaviourism," a modern variation of that heresy, as "an example of those theories which are so preposterously silly that only very learned men could have thought of them."

There is no conflict between religion and science; but there is a very real conflict between reason and unreason, between science and those who usurp the name of science to attack the very source of science itself.

"It is true," as Lord Rayleigh remarked in that Presidential Address which I have already quoted, "that among scientific men, as in other classes, crude views are to be met with as to the deeper things of Nature; but that the lifelong beliefs of Newton, of Faraday, and of Maxwell, are inconsistent with the scientific habit of mind, is surely a proposition which I need not pause to refute."

It is the duty and privilege of science to interpret the world of experience, and for the rest: "*ἀρκεῖ γὰρ η πάτριος καὶ παλαιὰ πίστις.*"

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